Enhanced Voluntary Action Issue Table
- Options Report -

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Prepared for:

The Enhanced Voluntary Action Issue Table

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Executive Summary

Voluntary initiatives (VIs) represent a broad range of measures to influence, shape, control or benchmark performance. They include both:

- actions taken unilaterally by companies, sector associations or individuals, and
- measures in which government is involved, either by providing incentives, accrediting performance or developing formal programmes or agreements in which individuals or companies participate voluntarily.

This summary of the report of the Enhanced Voluntary Action Table lists:

- the Table's main ***conclusions*** about VIs;
- the Table's main ***recommendations*** about the kind of supportive action required to enhance VIs to reduce or offset GHG emissions; and
- the ***areas for further work*** recommended by the Table concerning the identification of specific VIs to support.

Conclusions

C.1 Voluntary action has an essential role to play in helping reduce, offset and sequester Canadian GHG emissions.

Existing efforts by individuals, businesses and other organizations (e.g., schools, hospitals) in Canada to reduce, offset or sequester GHG emissions voluntarily should be reinforced and new efforts should be supported because:

- it should be possible to deploy VIs more quickly than other approaches because of the widespread preference for VIs to more coercive measures to control GHG emissions;
- properly applied, designed, and supported VIs can make an important, cost-effective, contribution to GHG emissions reductions, offsets and sequestration activities while accommodating economic growth and other social goals;
- VIs allow decisions to be made by those who know their operations best; and
- the partnership approach that can be engendered by VIs supports the culture change that will be required to reduce GHG emissions significantly in Canada.

Because all Canadians contribute to GHG emissions, ***all will need to be engaged to participate in voluntary efforts to reduce or offset these emissions.***

C.2 Significant barriers currently impede voluntary action to reduce and offset GHG emissions in Canada.

These include:

- *lack of awareness* (of climate change as an important economic and environmental issue and of "win-win" opportunities to reduce GHG emissions and operating costs);
- *unclear priority of climate change action in relation to other environmental and social issues;*
- *lack of widespread commitment to act on climate change issues* (among many individuals, government and business leaders);
- *insufficient regulatory and financial motivators* (small savings from conserving energy, lack of incentives);

- *regulatory and policy barriers that inhibit actions to reduce or offset GHG emissions;*
- *absence of a supporting policy framework and infrastructure*; and
- *the perceived risk of taking early action.*

C.3 In order to dramatically enhance their contribution to reducing and offsetting GHG emissions, VIs must be supported by incentives and, in some cases, consequences.

A number of opportunities currently exist for Canadians to increase energy efficiency and reduce costs simultaneously. Economically-attractive opportunities also exist to sequester carbon and to control other GHG emissions (e.g., methane from landfills). Although significant, an EVA strategy focused solely on these "win-win" opportunities will not likely meet Canada's goal of an absolute six percent reduction in emissions by 2010. Despite the fact that various VIs illustrate that organizations and individuals can "do the right thing" even where such action is not strictly economic, in general Canadians, cannot be expected to make investments to reduce GHG emissions or sequester carbon unless they can make a business case for such measures. The removal of existing barriers, and the provision of strong incentives for action or, in some cases, consequences for inaction will therefore be required to induce most Canadians to voluntarily go significantly beyond "win-win" opportunities to reduce emissions. These motivators will also reinforce and encourage further efforts by those Canadians who have already shown leadership.

It is important to note that, while governments will necessarily play a major role in providing incentives either directly (e.g., technical assistance) or indirectly (by setting broad market rules), they are not their only source: industry associations (by developing environmental policies and codes), informed consumers (by demanding less GHG-intensive products) and corporate purchasers (by helping their suppliers improve their environmental performance), for example, can also all encourage greater voluntary action to reduce GHG emissions.

C.4 VIs will gain broad acceptance only where they are both credible and effective.

VIs must be applied in appropriate circumstances, designed to meet the needs of both proponents and participants, and provided with incentives commensurate with the level of performance expected of participants. In order to be credible, participants must ensure that VIs are transparent, that opportunities for public input exist and that VIs demonstrate results through measurement, accountability and public reporting mechanisms.

C.5 An emphasis on voluntary action will challenge businesses, other organizations and governments to develop new skills, establish new management systems and work more collaboratively and openly.

Supporting the partnership and facilitative role required to promote voluntary action while ensuring that the desired results are secured will require governments to develop new skills and new institutional arrangements. For their part, businesses and other organizations will need to put in place management systems to help them calculate emissions, set objectives, identify actions, track performance and audit results. Governments, businesses and other organizations will also have to improve their skills in engaging employees and individual citizens and motivating them to reduce GHG emissions.

Recommendations

Canada's GHG emission reductions goal is very ambitious. Relying primarily on voluntary action will therefore require the engagement of all Canadians and the establishment of a supportive policy framework and infrastructure, including incentives and, in some cases, consequences, to enhance existing VIs and promote new ones. Canadian governments, businesses and other organizations should work together to establish these elements as soon as possible both because Canada's GHG emissions are continuing to grow and because it often takes time for VIs to achieve their full potential.

R.1 Canadian governments, working in partnership, should:

a. establish a coherent policy framework that includes:

- a consistent and transparent approach to determining which climate change-related VIs to endorse and what benefits to provide to participants in such VIs;
- clear and sustained leadership by setting the example, making the needed resources available and encouraging voluntary action by others;
- a programme for baseline protection;
- a credit for early action;
- increased public awareness of climate change issues; and
- additional supporting measures that may include regulatory, fiscal and market-enhancement policies.

b. create an infrastructure to support specific VIs that includes:

- enhanced support for programmes such as the Canadian Industry Program for Energy Conservation (CIPEC);
- the creation of national emissions registries, building on the VCR and EcoGESte, to ensure the availability of credible information about GHG emissions and about reduction, offset and sequestration actions;
- support for voluntary emissions trading;
- rules regarding offsets and sequestration;
- a focus on community- and consumer-based initiatives; and
- strengthened capacity to champion, evaluate and monitor VIs.

c. link incentives to performance and transparence.

VIs to reduce or offset GHG emissions will take many different forms, and not all will involve governments. Once a VI develops to the point where its participants want to receive incentives, engage in trades, or claim credits or offsets (i.e., to receive certain benefits from government), however, the government(s) supporting the VI should:

1. require that the VI meet the following minimum design requirements:

- clear, measurable, objectives;
- provisions for continuous improvement; and
- clearly defined measurement, verification and public reporting procedures.

2. ensure that the incentives and consequences made available are appropriate to achieve the level of GHG emission reductions sought.

R.2 Individual organizations should put in place environmental management systems that will support reductions in GHG emissions.

More specifically, Canadian businesses and other organizations should:

- incorporate climate change considerations into their business decisions;
- strengthen existing VIs or initiate new ones by:
  - setting emissions reduction and/or energy efficiency targets;
  - developing emissions baselines and tracking systems;
  - raising awareness among their employees and train them where required;
  - supporting mechanisms to transfer best practices within and between industries;
  - working with external stakeholders; and
  - improving their public reporting.
- support voluntary action by SMEs (e.g., through offsets); and
- contribute to the development of the policy framework and infrastructure described above.

R.3 Governments, businesses and other organizations, working in partnership, should support voluntary action by individuals by:

- informing employees and consumers about the environmental and economic implications of their individual actions or behaviour;
- sponsoring eco-labelling programmes and analytical tools that enable individuals to assess the GHG impacts of the products and services they buy; and
- delivering energy services (e.g., audits, retrofits) to the householder in ways that minimise upfront costs.

Through their control over land use and transportation planning, municipalities have a particularly important role to play in encouraging and supporting individual action.

Government or corporate sponsored VIs oriented towards individuals should:

- include clear and concise communications (e.g., "Don't drink and drive");
- provide informed choices and tools, not rules;
- contain clear objectives and expectations;
- include meaningful inducements to act;
- provide messages at the point of purchase; and
- engage peer pressure.

Where these actions result in measurable emissions reductions for which parties may claim credits, incentives or offsets, the actions will have to meet the performance and transparence standards described in Recommendation R.1 above.

R.4 The implementation of climate change-related VIs should draw from related experience.

The experience with VIs in non-environmental issues, in other countries and in other environmental issues suggests that the implementation of climate change-related VIs should:

- use existing communication channels to reach groups and individuals;
- reach leaders and early adopters who can promote the message to the larger group;
- provide leadership to introduce innovation;
- use customised approaches;

- be kept simple and easy to join; and
- allow the involvement of affected parties.

Areas For Further Work

As stated earlier, all decision-makers will ultimately need to be part of a national implementation strategy. Designing and implementing VIs to include most of these decision-makers is likely to be time-consuming, and therefore priority needs to be given to identifying areas in which VIs are most likely to be most credible and effective.

1. Governments, businesses and other stakeholders, in partnership, should build on the work of this Table to identify the most significant opportunities for voluntary action to reduce or offset GHG emissions

The EVA Table has begun the analysis required to identify VIs most likely to be successful and have a large impact, and recommends that ***decision-makers should consider the following factors to identify industry sectors with high potential for concerted voluntary action to reduce GHG emissions***:

- *GHG emissions*
  - Percent of national GHG emissions;
  - Forecast growth or reduction in emissions.
- *Technical potential*
  - GHG emission intensity;
  - Recent improvements in GHG emission intensity;
  - Availability of technically and economically feasible alternatives;
  - Unrealised economic gains from energy efficiency (i.e., economic opportunities);
  - Rate of technological innovation and capital stock turnover (the faster these are, the more amenable the sector will be to voluntary action that requires new investments).
- *Corporate structure and culture*
  - Level of organization (in general, more organized sectors will be less likely to confront free riders, more likely to be supported by industry associations in an effective leadership role and more able to foster cross-company information exchange and peer pressure);
  - Sophistication of environmental management;
  - Homogeneity and level of concentration (although not definitive criteria, in general, higher levels of each of these can help minimize the risk of free riders and the transaction costs associated with designing, administering and overseeing the VI);
  - Openness to trade (the more significant imports are, the less likely a domestic program will be able to influence behaviour);
  - Price sensitivity (where firms compete largely on the basis of price, there will be less opportunity to engage in VIs that increase costs);
  - Penetration of existing VIs (an indicator of the familiarity with this instrument);
  - Presence of leaders (important to champion initiatives and establish benchmarks).
- *Public awareness and concern about the sector*
  - Can lead to pressure that will support voluntary action

Similar considerations, with some different variables, should also be used to determine the potential for VIs in the transportation, commercial and residential sectors.

2. Governments, businesses and other stakeholders, in partnership, should build on the work of this Table to identify and support the specific VIs that are most likely to be credible and effective

There are many different types of VIs that could be applied to reduce GHG emissions. These types are not mutually exclusive and a given decision-maker may be involved in more than one type of VI at a time. These include:

- *Government stewardship initiatives* (to reduce GHG emissions from government operations);
- *Government challenges* (voluntary registries and programmes that encourage action without relying on binding agreements);
- *Awareness-raising*;
- *Technical assistance* (to accelerate the use of "best-practice" technologies);
- *Technology innovation programmes* (to advance the frontier of "best practice);
- *Collaborative efforts agreements* (such as the Dutch energy covenants);
- *Regulatory flexibility agreements* (allow opting out of existing or future regulations or taxes in return for specified environmental performance commitments);
- *Labelling programmes*;
- *Voluntary product and process standards* (e.g., ISO, CSA and standards developed by industry consortia or NGOs);
- *Supplier challenges* (requirements by governments or large corporate buyers of goods and services that suppliers and their products meet specified environmental attributes);
- *Sectoral codes and programmes*;
- *Company-specific codes and policies*;
- *Company-NGO agreements*; and
- *Company-community agreements*.

This report presents a preliminary analysis of afforestation and other forest management VIs and a description of the following VIs:
Collaborative efforts agreements,
Supplier challenges,
Sectoral codes/ programmes,
Company codes/ programmes,
Technical assistance programmes,
Voluntary technical standards,
Programmes directed to the householder.

Decision-makers should build on this preliminary analysis, using the following factors to help identify priority VIs:

- *Objectives and targets:*
  - Fuel substitution? Increased efficiency? Carbon sequestration?
  - Absolute cuts in emissions? Improvements in efficiency? Amount of carbon sequestered?
- *Participation:*
  - Single company, sector specific or cross cutting?
  - Characteristics of the types of sectors or actors that could participate effectively (numbers, size of organization, concentration, importance of imports and exports, etc.).
- *Main design features:*
  - How do participants join?

- How will free riders be addressed?
- Transparency and reporting features.
- Designing an emissions baseline.

- *Incentives for participation:*
  - What are they?
  - Who will provide them?
  - How much will they cost?
- *Necessary or desirable supporting measures:*
  - Role of government (Regulations required? Fiscal measures required? Linkages to other programs required? Barriers to be removed? Reward/recognition program? Other?)
  - Role of industry associations?
  - Role of others?
- *Feasibility:*
  - Experience in other jurisdictions.
  - Stakeholder views.
- *Potential impacts:*
  - Time frame to achieve results (Short, medium or long term).
  - Cost (to participants, to government, to the public).
  - Distributional impacts.
  - Competitiveness impacts.
  - Emission reduction potential (low, medium, high).
  - Other environmental impacts (L, M, H).

1. Introduction

1.1 Purpose

This report is one of a series prepared by sixteen Issue Tables under the National Climate Change Process. Its purpose is to identify, describe and analyse:

- the policy framework and infrastructure needed to enhance existing voluntary initiatives (VIs) and promote new ones to reduce or offset greenhouse gas (GHG) emissions; and
- selected new voluntary initiatives (VIs) or changes to existing VIs that could make a contribution to a Canadian greenhouse gas (GHG) abatement strategy.

Building on its Foundation Paper, in this report, the Table on Enhanced Voluntary Action:

- discusses the prerequisites to the effectiveness and credibility of VIs,
- recommends the main elements of the policy framework and infrastructure needed to support VIs to reduce or offset GHG emissions;
- identifies and describes 14 generic types of VIs; and
- proposes criteria for evaluating these types of identifying priority VIs.

This report also summarizes preliminary analyses of several possible VIs. The current work of this Table ended before we could test our recommendations with other Issue Tables. As a result, we do not suggest specific VIs for implementation. Such detailed design will have to await the reports of the other Tables later this summer.

1.2 Background

In December 1997, representatives from Canada and 160 other countries met in Kyoto, Japan, and agreed to a Protocol to the *Framework Convention on Climate Change* that calls for reductions in GHG emissions. At that meeting, the Government of Canada made a commitment (not yet ratified) to reduce Canada's emissions to 6% below 1990 levels between 2008 and 2012. This commitment and similar ones by our major trading partners are prompted by concerns about the potential environmental, social, economic and human health impacts of a rapid rise in global temperatures.

Whether as a result of the Kyoto Protocol, another future international agreement or the emerging market dynamics, Canada and other industrial countries appear to be entering a carbon-constrained world and will have to make major efforts to control and ultimately reduce their GHG emissions. The latest forecast of Canadian energy demand by Natural Resources Canada estimates that, if nothing more is done, Canadian GHG emissions will grow by about 20 percent above 1990 levels by 2010. In order to meet its Kyoto target, Canada will therefore have to reduce emissions by about 22 to 25 percent from a "business as usual" scenario.

Canadian decision-makers, including governments and industry, have indicated that they would prefer to rely primarily on voluntary approaches to achieve GHG reductions. Canadian energy and environment ministers, for example, have highlighted the "strengthening [of] voluntary action" as a key element in Canada's national climate change implementation strategy.

In its Foundation Paper, the Enhanced Voluntary Action (EVA) Issue Table reviewed 37 VIs related to reducing GHG emissions in Canada. Although more such VIs exist, little empirical information is available on their effectiveness in reducing Canada's GHG emissions. Nevertheless, it is clear that VIs will have to be much more aggressive than they are now if they are to make a substantial contribution to a Canadian GHG emissions abatement strategy, as *the Natural Resources Canada forecasted gap of 22 percent referred to above already incorporates the anticipated effects of existing VIs.*[1]

Climate change cuts across many environmental and economic issues and a strategy to reduce or offset GHG emissions should not be developed in isolation from other societal objectives such as employment, rising incomes, pollution prevention or good health care, particularly since the estimated costs of effective mitigative measures are high. In a world of scarce resources, Canadians may have to make trade-offs in pursuing these objectives although the nature and scale of these trade-offs are difficult to calculate as they depend in part on assumptions regarding the environmental and economic costs of climate change, technological progress, actions by our major trading partners and the choice of instruments used. More than most issues, climate change will require decision-makers to integrate environmental, social and economic considerations, take a long-term perspective and be concerned about distributional impacts.

1.3 What Are Voluntary Initiatives?

The federal government defines voluntary codes as "a non-legislatively required commitment, agreed to by one or more entities, designed to influence, shape, control or benchmark behaviour and applied in a consistent manner to reach a defined outcome" (Government of Canada, March 1998). NGOs believe that VIs, like other policy instruments, should help make decision-makers and individuals more socially and environmentally responsible. Pollution Probe, therefore, recommends that the federal government definition be modified as follows (additions in italics):

> "a non-legislatively required commitment, agreed to by one or more entities, designed to influence, shape, control or benchmark behaviour *and performance* and applied in a consistent *and publicly acceptable* manner to reach a defined outcome" (Pollution Probe, 1999).

VIs represent a broad family of related measures that includes:

- *Government stewardship initiatives* (e.g., Federal Building Initiative, municipal streetlighting retrofit);
- *Government challenges* (e.g., US Motor Challenge);
- *Awareness-raising* (e.g., R-2000 houses);
- *Technical assistance* (e.g., Renewable Energy Development Initiative, PowerSmart);
- *Technology innovation programmes* (to advance the frontier of "best practice");
- *Collaborative efforts agreements* (e.g., the Dutch energy covenants);
- *Regulatory flexibility agreements* (e.g., the US Program XL or Danish CO_2 tax);
- *Labelling programmes* (e.g., EnerGuide, Environmental Choice);
- *Voluntary product and process standards* (e.g., ISO 14 000);
- *Supplier challenges* (e.g., pollution prevention challenges by automobile manufacturers);

[1] Although this forecast was prepared in 1996 and additional voluntary actions have been taken since then, NRCan officials do not believe that these change the forecast materially.

- *Sectoral codes and programmes* (e.g., Canadian Electricity Association's Environmental Commitment and Responsibility);
- *Company-specific codes and policies* (e.g., BP/Amoco);
- *Company-NGO agreements* (e.g., Pew Centre on Global Change); and
- *Company-community agreements* (e.g., Great Lakes remedial action plans).

Each of these can take many different shapes. Awareness-raising programmes, for example, can be directed at the consumer (e.g., EnerGuide) or the producer (e.g., some pollution prevention MOUs). Some of these initiatives can be undertaken unilaterally by single companies (e.g., TransAlta), by individuals (e.g., consumption changes) or by governments (e.g., various stewardship programmes). Others, however, will involve partnerships between government and industry (e.g., negotiated agreements), within industry sectors (e.g., the Canadian Electricity Association's Environmental Commitment and Responsibility programme) or across sectors (the development of environmental management standards).

VIs are also sometimes combined so that, for example, challenge or regulatory exemption programmes can include a technical assistance component. Table 1 illustrates the range of existing and possible VIs in the climate change and energy efficiency areas, categorised by sector and type of decision-maker. Further information on the differences between and among VIs is available in the EVA Foundation Paper.

Table 1: Illustrative Voluntary Initiatives

Source of Emissions	Decision-Makers			
	Governments	**Large companies**	**SMEs**	**Individuals**
Transportation	• local TDM initiative (e.g., ridesharing) • awareness-raising for fleet managers (e.g., FleetWise) • standards and codes of practice	• • supplier challenge • standards and codes of practice (e.g., TAC)	• fleet management programme • gov't led awareness-raising programme to help fleet operators (e.g., FleetSmart)	• awareness-raising programme (e.g., Auto$mart) • codes and standards
Industry	• Challenge and awareness raising (e.g., CIPEC) • Technical assistance (e.g., IRAP) • Energy Innovators Initiative	• negotiated agreement • supply chain environmental criteria • challenge programme (e.g., EcoGESte, VCR) • unilateral sectoral initiative (e.g., Responsible Care) • gov't led initiative to promote voluntary action (e.g., CIPEC) • ecolabelling (e.g., Environmental Choice)	• awareness-raising and technical assistance programme • ecolabelling initiatives • challenge programme (e.g., EcoGESte, VCR)	• consumer information programme (e.g., various NGO campaigns)
Residential	• demonstration & training (e.g., R2000) • consumer information (e.g., EnerGuide) • technology development & transfer programme (e.g., BETA Plan)	• unilateral company initiative to exceed building code • unilateral initiative to increase household appliance efficiency • utility DSM programme	• unilateral company initiative to exceed building code requirement • unilateral initiative to increase efficiency of household appliances	• home visits (e.g., Eco Action Sudbury) • CO_2 diet program • "green" mortgages (TD Bank and Canada Trust)
Commercial	• energy efficient buildings initiatives (e.g., Toronto's Better Building Partnership, Federal Buildings Initiative) • technology development and transfer (e.g., BETA Plan - large buildings)	• energy efficiency (e.g., US Green Lights) • gov't led fiscal initiatives to encourage energy efficiency (e.g., Commercial Building Incentive Initiative) • unilateral sectoral initiative (e.g., hotels)	• awareness-raising and technical assistance programme	• "green" investment funds • "green" hotels • EnerGuide
Energy production	• green energy procurement	• voluntary emissions trading • business helping business through knowledge sharing (e.g., GEMCo)	• market development programme for renewables	• green power options • PowerSmart
Forestry/ agricultural sinks	• Tree Canada Foundation	• negotiated agreement • guiding principles and codes of practice (e.g., ForestCare)	• guiding principles and codes of practice (e.g., ForestCare)	• incentive programmes for farmers and woodlot owners • Arbour Day

Note: The horizontal axis categorises decision-makers according to major differences in characteristics and motives (See EVA Foundation Paper). The vertical axis divides emissions according to their source using a standard energy analysis framework.

2. Overarching Considerations Concerning the Role of VIs in Reducing or Offsetting GHG Emissions in Canada

If they are to play a central role in a Canadian climate change strategy, VIs will need to meet two over-riding goals: they will have to be cost-effective and they will have to be publicly trusted. Achieving the former goal will largely be a function of financial and non-financial incentives, while the latter will depend substantially on programme design, including reporting.

2.1 Cost-Effectiveness

2.1.1 Benefits and Costs

VIs can have significant benefits to participants. One of the reasons why industry and governments promote VIs is that they believe VIs can often achieve a given environmental goal at a lesser cost than other instruments. Depending on the circumstances, the potential benefits of VIs to participants also may include:

- faster implementation,
- lower costs as a result of greater flexibility,
- greater commitment to resolving the environmental problem,
- the achievement of environmental goals beyond regulatory requirements,
- increased productivity and market share,
- improved reputation,
- greater opportunities for innovation,
- higher employee morale, and
- better internal communications.

> The value of VIs needs to be seen not only at the level of the VI itself, but also as a part of a broader process towards shared responsibility, self-regulation, and indeed towards a new ... pro-active environmental responsibility.... Important benefits also lie in the role of VIs in institution building, ... new technology market development and technology transfer, and in environmental awareness raising .... Furthermore, VIs are valuable in their role as starting or continuing a process which, if monitored and guided appropriately, can lead to further pro-active initiatives by industry and other sectors of the economy.
>
> The key value of the VI instrument, with respect to other instruments, lies in its ability to build on the particular knowledge of each stakeholder ... of their capacity to address environmental challenges ... and the possible widespread internal adoption of a pro-active environmental culture. This can support the continued process of shared responsibility and development of the VI, and can help lead, if the VI is designed and implemented appropriately, to significant and cost-effective reductions in emissions, reducing the burden on industry while achieving the needed reduction targets.
>
> *ECOTEC Research and Consulting for ICC, WBCSD, US CIB, Keidanren, WWF and UNEP, Feb. 1999*

From a public policy perspective, VIs also offer the advantages of reinforcing public education and outreach initiatives and of encouraging precautionary action by leaders.

VIs are not cost-free, however. As long as they focus on "win-win" solutions, they are likely to be financially attractive to participants. To the extent that these "win-win" solutions do not cover the

full gap between Canada's Kyoto goal and forecast emissions levels, however, the use of VIs to go beyond "win-win" opportunities will eventually impose net costs on participants. Participants may be willing to bear additional costs to the extent that they are offset by incentives or they perceive the costs of VIs to be lower than that of alternatives.

VIs also may involve significant transaction costs where more than one party is involved and the design (objectives, timetables, incentives, reporting mechanisms, etc.) of the VI is negotiated. An example would be a carbon sequestration opportunity which would require the participation of thousands of landowners spread over a wide geographical area. Such transaction costs can be kept to a minimum where a VI follows a standard formula (as is the case with many US energy efficiency VIs). Reporting with sufficient rigour to engender public trust can be another significant transaction cost where no previous reporting obligation existed.

Even where VIs represent the least-cost strategy for individual participants, it does not follow that they will constitute the least-cost strategy for Canada as a whole. Low-cost opportunities may remain begging, for example, where the decision-makers controlling them are not involved in a VI. Analyses of the economic, untapped, Canadian energy efficiency potential implies that several low-cost opportunities are not being exploited (See Section 8). It is important to understand why this is so, what barriers may exist and what programme (voluntary or not) may be required to realise these opportunities. Where this situation occurs, a country relying on VIs will be forced to consider higher-cost actions than would be desirable. The Government of New Zealand cites this argument to justify its preference for a GHG abatement strategy based on an economic instrument (emissions trading) (New Zealand, 1999).

Because GHG emissions are inherent to almost all human activities, all decision-makers will ultimately need to be part of a national abatement strategy. These decision-makers are numerous, heterogeneous and widely-dispersed. While some types of decisions affecting GHG emissions are made by only a few decision-makers a few times a year, others are made by thousands or millions of decision-makers every day. Designing and implementing VIs to include most of these decision-makers is likely to be onerous and difficult and therefore priority needs to be given to identifying areas in which VIs are most likely to be credible and effective. Sections 4 and 7 of this report provide the analytical approach for such priority setting and present some preliminary analysis.

2.1.2 Incentives

Many Canadians are sceptical of the priority that should be attached to climate change (See Section 3.2). While some social or environmental VIs have succeeded by appealing to the altruistic or socially-conscious, such appeals may have limited effect when it comes to reducing GHG emissions as long as climate change is not a societal priority.

Where they question climate change's priority, other arguments will have to convince decision-makers, including individuals, as to why they should voluntarily reduce GHG emissions or sequester carbon. These arguments could include lower operating costs, increased good-will from clients, responsible risk management, public recognition, or other rewards. The point is that if decision-makers do not perceive that voluntary action is in their interest, they will not pursue it.

> ... Even where VIs offer to be a useful instrument, the key to their success lies not only in the appropriate design but also in ensuring that there are appropriate carrots and sticks for the VI – that is, complementary incentives (both for engagement in the VI and in

> appropriate implementation of the VI), and complementary threats of penalties or indeed sanctions. Furthermore, it is essential that other instruments – regulation, taxation, technology support programmes, public reporting, EMS implementation, public awareness, self-declarations and codes of conduct – are also assessed to see whether they would be appropriate complements in addressing the environmental issue concerned.[2]

Incentives,[3] both positive (e.g., technical assistance) and negative (e.g., threat of government intervention), can play an important role in motivating GHG emissions reductions by integrating environmental performance more closely with business goals and operations. Some incentives – primarily related to flexibility and reduced costs – may be inherent to a VI and may be sufficient to drive progress in and of themselves. In other circumstances (e.g., where most of the benefits accrue to others, or society, rather than the organization or individual), however, these inherent incentives may not be powerful enough to alter behaviour in a way that would achieve public policy goals fully. For example, a carbon sequestration opportunity may have associated to it substantial non-carbon benefits such as protecting wildlife habitat, enhancing biodiversity and reducing erosion. To prevent a situation where these benefits were not realised because a firm could only capture part of them, the government might consider introducing an incentive to cause the firm to take this socially-desirable sequestration action. In theory, incentives will be warranted where their cost is less than the social benefits that they engender. In practice, the costs are likely to be easier to estimate than the benefits, complicating the calculus of how much incentive to offer. Further, in the case of offsets or sequestration, the challenge will be to set a level of incentives that is sufficient to motivate action yet not so attractive as to divert attention away from preferred courses of action, which can reduce other harmful air emissions.

It is important to note that, while governments will necessarily play a major role in providing incentives either directly (e.g., tax benefits) or indirectly (by setting broad market rules), they are not their only source: industry associations (by developing environmental policies and codes), informed consumers (by demanding more energy-efficient products) and corporate purchasers (by helping their suppliers improve their environmental performance), for example, can also all encourage greater voluntary action to reduce GHG emissions.

2.2 Trust

Earning and retaining trust are essential to the design and implementation of most VIs (New Directions Group, 1997). While some VIs have been in place for many years (e.g., CIPEC, Responsible Care), their record is not always fully communicated or appreciated. The fact that new VIs are being promoted at the same time as significant cuts have been made to government regulatory capacity has also hurt their credibility. This trend has led some NGOs to worry that environmental protection levels will be set by what VI participants can afford rather than by what public policy needs might dictate. In some cases, the absence of measurable objectives, vague obligations on participants and the lack of consequences for non-performance have also led to criticisms that VIs are little more than a public relations gesture.

While the requirement for trust is often articulated as being a public credibility issue, a high level of trust is also required among the different parties to a VI. A VI involving industry and

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[2] ECOTEC Research and Consulting for the Multistakeholder Group: ICC, WBCSD, US CIB, Keidanren, WWF and UNEP, Feb. 1999.

[3] Throughout, this report uses the word "incentive" in its broadest meaning as a motivator to action that can be non-financial as well as financial.

government, for example, raises risks for both sides: for industry, the main risks include the possibility of eventual government intervention over and above the VI, the possibility that information disclosure to government and the public will increase pressure on the VI participants and that free-riders will undermine the VI itself. The major risk for government is that the VI will be ineffective, thereby forcing the design and use of alternate policy tools under perhaps less favourable conditions than existed before (e.g., shorter timelines to reach targets) after having incurred potentially high transaction costs in developing and monitoring the VI. Where an NGO is involved, the greatest risk is a loss of reputation where its supporters challenge its endorsement of a VI (ECOTEC, 1999).

In order to reduce these risks and reap the rewards that the VI offers, participants must therefore ensure that the VI is transparent, that opportunities for public input are provided and that a clear accountability for the VI's outcome is established. The means most often used to achieve these ends after the VI is established involves public reporting. Quantifying targets, setting timetables and inviting public comment can also help build confidence in a VI.

3. Barriers to Voluntary Action to Reduce or Offset GHG Emissions

The EVA Table's Foundation Paper identifies several barriers to voluntary action to reduce or offset GHG emissions. Some of these are particularly significant and deserve elaboration here.

3.1 Lack of Awareness

Lack of awareness of climate change has been repeatedly identified as a major obstacle to voluntary action (EVA Foundation Paper, 1998). It is referenced in the Municipalities Foundation Paper, in the Industry Table's paper on SMEs and the Public Education and Outreach Table. This barrier exists at various levels: many decision-makers are not aware that climate change is a significant environmental and economic issue; even when they are, they may not know what to do to address it. Whatever strategy Canada adopts, a substantial increase in awareness and capacity (e.g., knowledge, tools) will be required in order to support both individual and collective action to reduce GHG emissions.

3.2 Lack of Commitment

Sustained leadership at the highest level is extremely important to the success of voluntary initiatives. Many Canadians remain sceptical about the priority that should be attached to climate change, however. This lack of conviction helps to explain why few political and industry opinion leaders (environmental opinion leaders are an exception) have spoken in favour of aggressive action to reduce GHG emissions (although some have spoken in favour of "no-regrets" measures). In the short term at least, governments may have to offset this scepticism with incentives. Even where they are made available, however, incentives may be ineffective in motivating action to reduce GHG emissions if they cannot overcome the view that other priorities are more important. In this regard, governments' reluctance to set environmental priorities makes it more difficult for industry and other organizations to focus their resources on a limited number of objectives.

Faced with competing priorities, decision-makers, including individuals, will look for investments that provide multiple benefits. Proponents of climate change-related VIs may therefore have to "sell" them for their other benefits, e.g., opportunities to cut costs or to modernise technology. One example is carbon sequestration in the form of afforestation that can offer benefits as diverse as biodiversity conservation, soil stabilisation, improved water quality, economic development and rural diversification. A focus on such benefits will often reveal greater scope for action than one based purely on an inventory of GHG emissions reductions opportunities.

3.3 Insufficient Motivators

Canadians face few financial or regulatory incentives to reduce GHG emissions. World oil prices, for example, are now at the same level in real terms as they were before the 1973 price shock. North American energy prices in general are lower than they are in Europe or Japan. While low energy prices are of obvious economic benefit, they do not encourage energy efficiency (although energy consumers always have an incentive to reduce costs, where these represent a large fraction of overall costs).

Case studies repeatedly show that the threat of coercive government action by way of regulation or taxes often represents the single most powerful driver for voluntary action (Bregha and Moffet, 1999; ECOTEC, 1999). The absence of a credible regulatory threat in Canada on issues related to GHG emissions or energy efficiency must therefore be seen as a disincentive to aggressive voluntary action, particularly when it is combined with existing scepticism over the climate change goals Canada should pursue.

Case studies also show the importance of providing incentives to motivate action, beyond internal ones already available to the decision-maker (the so-called "win-win" investments). As stated in Section 2.1.2 above, these incentives can take many forms: technical assistance, recognition, tax advantage, access to markets, marketable credits, etc. There are very few such incentives currently available to those individual Canadians and businesses willing to reduce GHG emissions or sequester carbon.

3.4 Lack of Supporting Policy Framework and Infrastructure

Effective VIs need to be supported by an infrastructure of related measures and programmes that encourage and facilitate voluntary action. At one level, this infrastructure may involve capital investments to make urban public transit more attractive or to offer consumers "green power". At another level, this infrastructure should include information and labelling programmes, training programmes, comprehensive emissions registries, and voluntary emissions trading programmes. It will have to exist at various levels from the national to the corporate. These elements do not exist systematically at present.

Many decision-makers see credit for early action as a prerequisite for voluntary initiatives to reduce GHG emissions or sequester carbon. Some parties, however, oppose credit for early action because it implies the eventual creation of a GHG emissions cap or, alternatively, that it would unnecessarily reward past "no regrets" actions. Although the absence of a credit regime has not precluded some companies from voluntarily reducing or offsetting their GHG emissions in the

past, delays in implementing such a regime are likely to postpone any significant additional corporate (and municipal) initiatives. Because slow progress in resolving this issue represents a major barrier to voluntary programmes, it will be important for governments to signal their continued commitment to developing solutions to this issue.

Who should receive credit for what action, however, has proven to be both a contentious and complex issue that may not be resolved for quite some time. Current government efforts, therefore, are being directed to the protection of emission baselines and developing methods to register action even in the absence of a credit regime. However, while baseline protection will ensure that companies are not disadvantaged for past actions taken, it may not provide sufficient incentives to reduce GHG emissions. Baseline protection is necessary but not sufficient and must be viewed as a step toward the implementation of a full crediting regime.

In response to these problems, the *Canadian Early Emission Reduction Program Collaborative*, an informal association of private sector firms and NGOs has developed a detailed proposal to encourage emitters voluntarily to commit to reduce their GHG emissions. The core of this proposal involves government exempting participating companies from additional policy requirements as long as their past efforts are recognised and they reduce their emissions according to prescribed norms and report on their performance.[4]

It is important to note that the absence of a system of credit for early action should not block all voluntary measures to reduce or offset GHG emissions. Companies will continue to invest in "no-regrets" measures. The absence of credit for early action, however, may tip the scale against marginal projects where the economic return alone would not warrant immediate action. Because it also underlines the risk of taking the initiative (e.g., participating in programmes such as the Voluntary Challenge and Registry before a system of credits existed), the lack of resolution of this issue discourages voluntary action in a much more fundamental way.

3.5 Barriers to Organizational Change

Some VIs to reduce GHG emissions or sequester carbon can entail simple technical "fixes" and can be implemented without much effort. Most, however, will require decision-makers to challenge the way they have traditionally operated. As such, the implementation of VIs will require emitters to overcome a variety of potential barriers, including:

- uncertainty (unwillingness to act voluntarily in the absence of certainty about future policy requirements);
- competing priorities;
- concerns about potential adverse effects of disclosing environmental shortcomings, impact on reputation, and confidentiality of information;
- concerns about free riders;
- insufficient incentives and recognition for leaders;
- cost issues such as limited capital due to pre-existing investment plans and concerns about short term cost versus long term pay back;
- inconsistent consumer behaviour (stated preferences versus actual purchasing behaviour);
- capacity issues (lack of information, lack of awareness and expertise); and
- inadequate indicators to measure progress.

[4] The many elements of this proposal are described in detail in working documents the Collaborative has prepared.

4. Towards New and Enhanced VIs for GHG Emissions Reductions or Offsets

The preceding sections provide a brief overview of some of the issues and challenges associated with enhancing voluntary action to reduce or offset GHG emissions. The remaining sections present recommendations for addressing these issues. Participants in new or enhanced VIs must be able to put forward a sound business case to justify the commitment of resources necessary to meet performance expectations. Proponents of VIs, in addition to being able to attract sufficient participants to make the VI successful, also need to ensure that the VI both produces the desired results and engenders the level of trust described in Section 2.2. Balancing the needs and expectations of VI proponents and participants is therefore fundamental to the development of credible and effective VIs. As stated in the EVA Foundation Paper, "...the right type of VI has to be applied in the right circumstances with the incentives to participate and perform clearly tied to performance expectations."

4.1 Applying VIs Appropriately

Like any other policy instrument, VIs will be more effective and efficient in some circumstances than others. Broad agreement is emerging about the circumstances in which environmental VIs are most likely to be successful. For example, the New Directions Group has proposed a number of criteria that are important to the successful application of VIs intended to achieve public policy objectives. These include:

- a *supportive public policy framework* that includes appropriate legislative and regulatory tools;
- *agreement among parties* that voluntary action is an appropriate, credible and effective method of getting desired results;
- *reasonable expectation of participation* in the program over the long term;
- *clearly defined roles and responsibilities* of all parties; and
- the *capacity* of all parties to fulfil their respective roles and responsibilities.

A wide variety of other factors determine whether the context is favourable for voluntary action. In the case of industry, some factors (e.g., the existence of unrealised economic gains, a homogeneous sector, rapid technological change, competition primarily on factors other than price, a high degree of concentration, an organized sector, limited imports) support concerted voluntary action while their absence can pose a barrier.[5] Conversely, the presence of other factors (e.g., high price sensitivity) can impede voluntary action. As a general rule of thumb, the smaller the number of firms, the lower the competition and the greater the concentration, the easier it will be to engage in concerted voluntary initiatives because it will be easier for the firms involved to reach consensus and also because there will be less risk of free riders (Solsbery and Wiederkehr, 1995; Strick, 1996).[6]

[5] Not all of these factors, of course, are relevant where only one firm is involved.

[6] Free riders refer to companies that reap the benefit of a VI without participating in it. Because the existence of free riders can discourage participation in a VI, it represents a major issue in determining when it is appropriate to use VIs and how to design them. While free riding will not be a concern for any VI focusing on "win-win" measures, it could become a problem where a VI leads to firms assuming net costs.

It is also important to recognize that it is possible for VIs to exist at different steps of a product's lifecycle and that some of these may offer greater opportunity for impact than others. Thus, for example, it is likely to be easier to reduce GHG emissions from the operation of office equipment by installing automatic power save features in computers and photocopiers than by training millions of Canadians in the energy-efficient operation of these machines. In deciding which VI to support, policy-makers should therefore look for the points of leverage that will yield the greatest impact on GHG emissions.

Two broad strategies exist to mitigate the effects of climate change: one is oriented to reducing GHG emissions while the second focuses on sequestering carbon. Because these strategies are very different, the issues one needs to address in considering VIs in each area are also different and are described separately in section 4.1.1 and 4.1.2 below.

In Section 7, the factors described in this section are used to suggest areas in which new or enhanced VIs to secure GHG emissions reductions or to sequester carbon may be possible.

4.1.1 Identifying Opportunities to Use VIs to Reduce Emissions

This section provides a preliminary analysis of the appropriateness of applying VIs in each of Canada's main energy consuming sectors. Although decision-makers in these sectors already participate in a variety of VIs, NRCan estimates that Canada's GHG emissions will continue to grow over the next 10 years if no additional measures are taken to curb them. To the extent that the impact of existing VIs is already captured in the NRCan forecast, those VIs will need to be enhanced or complemented by new ones if Canada wishes to further reduce its GHG emissions.

4.1.1.1 Residential sector

This sector accounts for 19% of secondary energy consumption but only 8% of GHG emissions[7]. While it is the only sector where emissions are expected to decline over the forecast period, even in the absence of additional measures, the technology exists to realise further substantial gains in energy efficiency. Because the sector is not much exposed to international competition, there is considerable scope for unilateral domestic action to reduce emissions.

Significant barriers will have to be overcome to realise these gains, however. These include limited consumer awareness and a low priority accorded to energy efficiency objectives by provincial housing ministries and municipalities. The very dispersed nature of the sector may also limit the effectiveness of voluntary action and require complementary regulatory measures such as minimum efficiency standards if additional cuts in GHG emissions are to be made.

Political economists (e.g., Purchase,1996) suggest that the ability to control free-riding, and therefore the effectiveness of VIs, increases as: there are fewer industry players; they have a history of effective cooperation; they are aware of each other's behaviour and can detect non-compliance; non-compliant behaviour can be punished; customers value compliant behaviour; customers can identify compliant firms; and there are many repeat transactions.

[7] These numbers do not include the use of the private automobile, which is covered under transportation, below.

4.1.1.2 Commercial and institutional sectors

These sectors account for 13% of secondary energy consumption but only 5% of GHG emissions. Here, too, the technology exists to realise significant additional gains in energy efficiency. Split incentives (where a building owner or a tenant cannot capture the full benefits of efficiency investments) and the low share of energy costs in total operating costs, however, are important barriers to accelerating efficiency gains. In addition, the heterogeneous nature of the sector is likely to make it more difficult to design national VIs.

4.1.1.3 Transportation sector

The transportation sector includes all road, rail, air and marine transport activity. In 1996, it contributed about 171 Megatonnes (Mt.) of GHG emissions. This is about 27 percent of total GHG emissions, and these emissions are expected to continue to grow substantially over the foreseeable future. Automobiles are the most significant emitters, accounting for about 39 percent of GHG emissions from the sector.

This sector differs from the preceding ones for being highly petroleum intensive. Its heterogeneity suggests that there may be important differences in the appropriate design of VIs among marine, road and air modes. The relatively small number of decision-makers in freight transport, for example, creates opportunities for voluntary action such as supply chain influence (section 7.2.2 describes supplier challenges in more detail). By contrast, VIs for private automobiles would have to overcome consumer preferences for large vehicles, long lead times for new technologies and the declining share of fuel prices in annual car operating costs. While many opportunities to reduce automobile GHG emissions exist, the over-riding characteristic of this sub-sector (a large number of dispersed consumers) implies that the potential for VIs to exert a large cost-effective impact on private vehicle emissions is much smaller than for freight. In its analysis of measures to reduce transportation-related emissions, the Transportation Issue Table is focusing primarily on economic and regulatory instruments.

4.1.1.4 Energy production sector

The electricity sector is in rapid evolution as a result of deregulation (and privatisation) in most provinces. The impact of these trends on GHG emissions is still unclear in many cases. The key industry driver on the fossil fuel side is protecting the capital investment in existing plant because future emission regulation would reduce this value (by making non-GHG emitting power sources more attractive). Delaying regulation until this investment has been fully amortized, however, would strongly limit the electricity sector's contribution to reducing GHG emissions over the next ten years.[8] While there are important regional differences, a large share of Canadian electricity supply comes from hydraulic and nuclear, and therefore low emission, sources (although, in Ontario, the marginal supply is coal).

GHG emissions from the upstream oil and gas sector are closely related to production levels and therefore export levels. While oil and gas producers are implementing measures to reduce their

[8] The electricity sector is considering how to reduce GHG emissions as its capital stock turns over. The Electricity Issue Table, however, has not developed VIs as part of its options paper. The Canadian Electricity Association, however, is sponsoring a voluntary sectoral code Environmental Commitment and Responsibility, that will address GHG emissions issues among others.

GHG emissions, it is still expected that the continuing growth in exports and a shift to higher energy-intensity sources (e.g., oil sands) will cause emissions to outstrip any efficiency gains.

4.1.1.5 Industry sector

The industry sector accounts for 44% of secondary energy use in Canada – 60% of that in 6 industries. The sector is highly heterogeneous both in terms of its lines of business and the composition of its membership (ranging from large multinational companies to SMEs).

Many industries have focused on energy efficiency, at least since the oil price shocks of the mid-1970s. Accordingly, much of the "low hanging fruit" already has been picked (although opportunities remain in every sector), and new VIs will not necessarily lead to dramatic improvements. Significant potential for improvement is often related to replacing major pieces of energy consuming equipment. However, the rate of capital stock turnover in some firms may not coincide with the timeframe of the Kyoto Protocol.

Investments are rarely made on the basis of energy cost savings alone and many energy-saving technologies have a poorer return on investment than alternative uses of capital. Investments in technology that reduce energy consumption are much more likely to be made when they also bring improvements in efficiency and productivity or other factors that enhance the firm's competitive position. It must also be noted that Canada is a technology taker in many industrial sectors and accordingly has little room for unilateral, technology-forcing, action that would increase energy efficiency beyond international standards (e.g., improved automobile fleet efficiency standards).

Similarly, many of Canada's most GHG-intensive industries produce basic commodities, where Canada is a price-taker in international markets. This will constrain their ability to absorb additional costs, even where greenhouse gas mitigation measures are undertaken on a voluntary basis. These firms are concerned that they may face more stringent obligations than competing firms in countries not subject to the same obligations under the Kyoto Protocol.

Several of Canada's industries also confront other environmental issues. Sometimes, the solutions to these other environmental issues require more energy (e.g., removal of sulphur from gasoline, enhanced use of recycled content in pulp and paper industries, reduction of toxic chemical usage, etc.). When environmental priorities conflict, reductions in GHG emissions will not always take precedence when firms are addressing GHG reductions purely on a voluntary basis.

Table 2, below, identifies the factors that could be used to identify industry sectors with high potential for effective voluntary action to reduce GHG emissions. Appendix Table 2 shows how these factors could be applied to different sectors of the economy.

Table 2: Criteria for Identifying Industry Sectors with High Potential for Effective VIs to Reduce GHG Emissions

GHG Emissions

- Percent of national GHG emissions
- Forecast growth in emissions

Technical Potential

- GHG emission intensity;
- Recent improvements in GHG emission intensity;
- Availability of technically and economically feasible alternatives;
- Unrealised economic gains from energy efficiency (i.e., economic opportunities);
- Rate of technological innovation and capital stock turnover (the faster these are, the more amenable the sector will be to voluntary action that requires new investments).

Corporate Structure and Culture

- Level of organization (in general, more organized sectors will be more likely to confront free riders, more likely to be supported by industry associations in an effective leadership role and more able to foster cross-company information exchange and peer pressure);
- EMS sophistication (an EMS is essential to the ability of firms to adopt and implement VIs effectively);
- Homogeneity and level of concentration (although not definitive criteria, in general, higher levels of each of these can help minimize the risk of free riders and the transaction costs associated with designing, administering and overseeing the VI);
- Openness to trade (the more significant imports are, the less likely a domestic program will be able to influence behaviour);
- Price sensitivity (where firms compete largely on the basis of price, there will be less opportunity to engage in VIs that increase costs);
- Penetration of existing VIs (an indicator of the familiarity with this instrument);
- Presence of leaders (important to champion initiatives and establish benchmarks).

Public Concern About Sector

- Can lead to pressure that will support voluntary action

4.1.2 Identifying Opportunities to Use VIs to Sequester Carbon

Opportunities to sequester carbon lend themselves to a different form of analysis than VIs oriented toward securing GHG emissions reductions. In most cases, it will not only be the GHG emitter who is taking voluntary action as emitters require one or more partners in sequestration projects. These partners are entities that are usually not required to reduce their own emissions but that can offer sequestration opportunities to the emitter in return for financial support (i.e. the partner does not require the carbon credit but can sell that credit to an emitter in return for the support necessary to undertake the action).

At present, carbon sequestration opportunities in the Kyoto Protocol are limited to afforestation and some reforestation activities. The inclusion of agricultural carbon sinks (such as the restoration of soil carbon pools) could significantly contribute to Canada's GHG emissions

reduction target, but this potential is not yet confirmed. Similarly, the inclusion of all activities in the so-called "managed" forest (including juvenile spacing, commercial thinning and fire protection) would enable a much broader range of sequestration opportunities. Earning recognition for the impact of these measures, whether voluntary or not, will depend on the outcome of international negotiations.

Indeed, even the sequestration activities currently included in the Kyoto Protocol are still surrounded by uncertainty. Agreement has yet to be reached on a definition of afforestation and reforestation and on acceptable procedures for the measurement and verification of performance in both areas. There is also a great deal of scientific uncertainty surrounding the process of carbon sequestration. The political and scientific hurdles associated with sequestration present substantial barriers to action and resolving these issues is a priority for Canada.

Some significant operational barriers to sequestration activities have been identified in the report *Implementing Carbon Sequestration Activities in Agricultural Soils and Forestry: Barriers, Options and Opportunities*. These include:

- conflicting government policies;
- tenure security (relating to forestry activities on Crown lands);
- risk management;
- lack of incentives; and
- costs.

Carbon sequestration opportunities will become clearer as many of these issues are resolved; however any resulting carbon sequestration projects that contribute to Canada's GHG emissions reduction strategy will have to pass the same tests of legitimacy as other VIs. TransAlta Corporation has been an early leader in the field of carbon sequestration and offsets and has recognized the need for such activities to be credible. In 1993, TransAlta struck a multistakeholder Greenhouse Gas Offset Advisory Committee that developed eligibility criteria for projects. These require that projects:

- contribute to net reductions in global levels of GHG;
- monitor and verify outcomes in a clear scientifically valid basis;
- demonstrate local support at the political and grass-roots level and be free of local opposition;
- avoid creating significant direct or indirect environmental or socio-economic impacts;
- are cost-effective;
- exceed a level of 500,000 metric tonnes of carbon equivalent over its lifetime; and
- the proponent must be willing to work with TAC to secure government approval of the project.

As with other potential VIs identified in this report, carbon sequestration projects will need to benefit from a supportive policy framework. This framework should include:

- a mechanism for allocating and recognizing carbon credits and debits;
- an emissions trading regime;
- incentives to support voluntary actions; and
- measurement and verification mechanisms established nationally.

Carbon sequestration initiatives will also be affected by the costs faced in (and the relative policy emphasis on) securing emissions reductions at source. A balance will have to be struck between the incentives available for carbon sequestration and the costs of securing reductions at source.

More importantly, however, some carbon sequestration programmes, such as afforestation, will involve a large number of partnerships and participants[9]. This will have a significant impact on both transaction costs and the marketing and public awareness components of these programs. Programs targeted at the agricultural landscape (whether afforestation or soil carbon enhancement) could require the participation of tens of thousands of farmers to be effective. This is where the dynamic of these types of VIs changes because instead of governments providing incentives to GHG emitters to undertake voluntary action, sequestration opportunities may involve governments and GHG emitters jointly providing incentives to prospective participants and for different reasons.

At the present cost/tonne of sequestered CO_2-equivalent, and with the restricted sequestration activities currently allowed through the Kyoto Protocol, there are limited sequestration opportunities in Canada. GHG emitters or governments are not likely to invest in carbon sequestration opportunities at a level higher than the value of the carbon sequestered unless there are non-GHG-related reasons for doing so, particularly until the uncertainties arising from Kyoto are resolved. For a GHG emitter, this could involve taking an equity position in the project if profits or a competitive advantage can be realized from the sequestration activity (such as from the sale of timber produced through afforestation). For government, non-carbon benefits could be as diverse as conservation (biodiversity or soil stabilization) and regional economic development.

Fortunately, most carbon sequestration activities provide a wide range of non-carbon benefits that are attractive to governments, GHG emitters or both. These benefits greatly increase the range of incentives available for such projects and the rationale for supporting them. For example, governments in Canada have long supported afforestation of marginal agricultural land even in the absence of any motivation related to carbon sequestration. In fact, for many sequestration projects, the actual value of the carbon sequestered is a side benefit of a project that is justifiable for other reasons.

These projects thus lend themselves well to partnerships between governments and GHG emitters. The emitter may be willing to invest in a project to the value of carbon sequestered while government (or indeed an investor in no need of carbon credits) may be willing to make an additional investment to support the non-carbon benefits derived from the project, and vice versa. Thus, the opportunities for leverage of the carbon credits secured through such projects are substantial.

4.2 Core Design Considerations

Applying VIs appropriately is one way of addressing the issues of cost-effectiveness and public trust. Another consideration, particularly in ensuring trust, is the manner in which VIs are designed.

In order to yield large cuts in GHG emissions, the new generation of climate-change related VIs will have to be designed more rigorously than many existing ones. Rigour in design does not equate to uniformity, however. Also, designing VIs too restrictively (e.g., by imposing onerous sanctions for non-performance) could backfire by discouraging participation. Similarly, imposing design requirements in the early stages of development of a VI may stifle innovation and experimentation.

[9] There are also several sequestration opportunities that forest companies can undertake on their own (see section 7.2.2).

The latter point is particularly important as VIs should not be seen as static programmes. They can, and often do, evolve over time by adding participants, tightening objectives, changing incentives or adding design features (e.g. verification). Thus, leading-edge participants can be expected to continue to improve their performance even after initial targets have been met provided that the added incentives for doing so are in place (see Section 5.3). Over time, an industry sector VI may set a new standard of acceptable behaviour, recognised both by the public and the courts.

One key design issue has to do with the stringency of the targets set by a VI. Ultimately, VIs should foster a change in the organization's culture by internalising a new behaviour. While there are many design and process related lessons that can help support this objective, such change inevitably requires time and sustained commitment. Experience with VIs involving more than one company suggests that many have begun on the basis of modest early steps that gradually build confidence and capacity to set more demanding objectives. Successful environmental VIs initiatives such as the Canadian Vehicle Manufacturers' Association (CVMA) MOU with the Ontario and federal governments and the Canadian Chemical Producers' Association (CCPA)'s Responsible Care programme have evolved over time, allowing senior executives in the participating companies to feel comfortable with each iteration, and to develop collective momentum in favour of successive improvements in environmental performance.

While some VIs may yield quick results by capitalising on "win-win" solutions, the impact of many is likely to be felt only over the long term, provided that they have established a framework for continuous improvement in performance. The problem is that such an organic evolution may not yield sufficient reductions in emissions and will invite the consideration of additional incentives or alternative instruments where pre-established targets exist. A key challenge in designing effective VIs for GHG emission reductions therefore lies in establishing targets at a "reasonable" enough level where they encourage participation but at a high enough level that they actually contribute materially to Canada's GHG reduction goals.

It is also important to distinguish between VIs that companies and individuals unilaterally enter into and VIs in which government is involved, either by providing incentives, endorsing performance or developing formal programmes or agreements. The experience with VIs in non-environmental issues, in other countries and in other environmental issues suggests various design and implementation lessons that are applicable to both types of climate change-related VIs:

- ***Use existing communication channels to reach groups and individuals*** (e.g., associations, trade groups, suppliers etc.).
- ***Reach leaders who can promote the message to the larger group and keep them visibly involved.*** Success often is linked to individual champions whose commitment has overcome organizational obstacles. Programmes should reach out to prospective participants, not wait for them to learn about and respond to the initiative.
- ***Provide leadership to introduce innovation.*** Focus groups can provide a forum where businesses and individuals can interact with all levels of government to find solutions to their environmental problems and implement best management practices.
- ***Use customised approaches.*** The needs of early adopters are not the same as those that choose to follow suit. Businesses in the early stages of adopting innovation respond to different messages than do businesses in the later stages. VIs need to relate to the core values of organizations. Their services and requirements must reflect the needs of their

participants.

- ***Be kept simple and easy to join and offer cost-effective options***. Small commitments lead to future actions.
- ***Sustain support***. Because the actions being taken are voluntary, they need continued support from the VI sponsors, be they governments, industry associations or NGOs.
- ***Allow the involvement of affected parties.*** Involving affected parties (potentially including employees, suppliers, neighbours, NGOs and even government, if appropriate) can ensure trust and good will and can engender external support and pressure for effective implementation and improvement.

In addition, the considerations related to public trust and effectiveness discussed in section 2, above, suggest that once a VI develops to the point where its participants want to receive formal support from the government (e.g., in the form of incentives, the right to engage in trades or to claim credits or offsets) governments should insist on the following core design elements:[10]

- ***Clear, measurable objectives***. Clear objectives and time-dependent targets are required to motivate and evaluate action.
- ***Flexibility***. The VI should provide participants with maximum flexibility in terms of how to achieve the objectives.
- ***Continuous improvement***. The VI should be designed so as to encourage continuous improvement.
- ***Effective measurement, accountability and public reporting mechanisms*** in order to allow Canadians to track progress and determine whether other steps are required.

In short, while joining VIs with which a government is formally involved will remain voluntary, once joined participants will have to assume certain performance and reporting obligations related to the level of incentives provided. The reason for this is twofold. First, proponents of VIs need assurance that participants in the program are producing desired results in order to justify both the continued allocation of resources and support to the program and the costs of the incentives being provided to participants. Second, participants in VIs, on the other hand, need to be able to demonstrate their performance in order to become eligible for the incentives or benefits they hope to receive.[11]

4.3 Overcoming Barriers

Assuming that the circumstances are favourable for a VI and that it can be designed in such a way as to ensure that its performance can be demonstrated and public trust secured, the next issue that must be faced is the business case that must be made by potential participants. There will often be a gap between what participants in a VI can afford to do and the performance expectations contained within a well-designed VI. Bridging that gap is the role of incentives, and the size of the gap will be a key factor in determining the cost-effectiveness of the VI in question.

The Conference Board of Canada differentiates incentives into three categories:

- *trigger* incentives, persuade participants to join VIs;

[10] See for example the European Commission's Communication on voluntary initiatives (1996), the New Directions Group's Criteria and Principles for the Use of Voluntary Non-Regulatory Initiatives for Environmental Policy Objectives (1997), the federal government's Guide to the Development and use of Voluntary Codes (1998) and ECOTEC (1999).

[11] This approach has guided the work of the Canadian Early Emissions Reduction Program Collaborative, and is reflected in their proposed design.

- *sustaining* incentives, keep participants within the VI over time; and
- *reward* incentives, provide benefits to participants in the VI on the basis of performance.

"Win-win" VIs are relatively straightforward as taking the requested action often makes good business sense or at least leaves the participant with "no regrets". The kind of incentives that may required to stimulate more of these VIs can therefore largely be non-financial in nature, such as awareness programs, public recognition or the provision of technical support. As net costs begin to be imposed by voluntary action, however, the need for stronger incentives increases. These may be negative, such as the threat of regulatory action which will require the potential participant to weigh the cost of joining the VI against the costs that might be imposed by other policy measures. Or they may be positive, such as accelerated capital cost allowance for new technologies or for the retirement of existing inefficient capital stock or relief from other policy or regulatory measures that may be imposed on non-participants or non-performers in the VI.

The barriers identified in Section 3 suggest that there will be a direct relationship (albeit not necessarily a linear one) between the incentives provided and the magnitude of GHG emission reductions once "win-win" opportunities have been captured. While there may be many ways to overcome barriers such as lack of awareness, lack of commitment or the impact of relatively low energy prices, the provision of incentives that financially reward certain behaviours is likely to have the greatest immediate impact. Neither organizations, such as firms, nor individuals will cut their emissions unless they see it to be in their interest to do so. Incentives that allow firms and individuals to cut or to avoid costs are likely to lead most rapidly to the convergence between the public interest in reducing GHG emissions and the private interest in increasing income. In short, if Canada is to pursue an aggressive voluntary strategy to reduce GHG emissions or sequester carbon, significant *reward* incentives are going to be required.

The list of available incentives to encourage decision-makers to reduce their GHG emissions is potentially quite diverse,[12] and varies not only with the behaviour or the activity to be changed but also the nature of the decision-maker (governments, large companies, small and medium enterprises (SMEs) and individuals). Incentives will also vary with the relative maturity and performance of a VI and of the participants within it. Incentives thus need to be tailored to the needs, capacities and circumstances of VI participants for the VI to be both effective and efficient.

Some key questions that need to be asked in determining what incentives will be appropriate to support specific VIs are:

- What changes in emission-causing behaviour are desired?
- What level of incentive will be needed to motivate those changes?
- Will the incentives' benefits outweigh their costs?
- How can these incentives be delivered most efficiently?
- Who should deliver these incentives?
- Who should receive these incentives?
- How should the costs of the incentive be allocated among governments, consumers and industry?
- How can incentives be modified as the VI matures?
- How can incentives to participants be differentiated on the basis of performance?

[12] See Enhanced Voluntary Action Issue Table *Foundation Paper*, November 1998.

4.4 The Three Core Elements of a National EVA Strategy

A Canadian climate change strategy relying on VIs will need to build on the guidance described above in order to overcome the barriers to action discussed in Section 3 and to ensure that VIs are both cost-effective and worthy of public trust (Section 2). Such a strategy will need to be developed at three distinct levels:

1. a ***policy framework*** will need to be put in place to support voluntary action in general. This framework should provide leadership and include measures to raise awareness, policies to support VIs, and regulatory, fiscal and indirect supporting measures (see section 5);
2. an ***infrastructure*** to support individual initiatives will need to be built or improved upon. The elements of such an infrastructure will need to include a registry of actions being taken and their impact (see section 6); and
3. ***specific VIs*** aimed at specific behaviours and specific decision-makers will need to be designed and implemented. The list of such initiatives is potentially very long. We have selected a representative sample of nine initiatives for analysis[13] (see section 7).

The next three sections of this report describe and analyse each of these elements.

5. First Element: A Supporting Policy Framework

5.1 The Need for a Supporting Framework

Climate change represents a huge economic, social and environmental challenge. As such, a GHG abatement strategy will have to engage all Canadian decision-makers – individuals, small and large corporations, NGOs and the governments themselves – in an explicit partnership to achieve a common goal.[14] A major role for governments at the federal, provincial and territorial level to play in this effort is the establishment of a policy framework that encourages a wide range of voluntary action to reduce or offset GHG emissions. There are three main reasons why governments should develop such a framework, independent of what they may do to promote specific VIs:

1. The climate change challenge is very large and requires concerted action by all decision-makers. The challenge for voluntary action is to demonstrate widespread progress in a relatively short timeframe. The experience in other settings (e.g., pollution prevention) indicates that governments can help legitimize, stimulate, structure and sustain a wide range of voluntary action through a supportive legal and policy framework.
2. Elements of the existing policy framework may impede voluntary action (e.g., some tenure arrangements in the forest sector); and

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[13] Because our work proceeded concurrently with that of all the other Issue Tables and, in some cases, in advance of them, we were not able to test these initiatives with other Table representatives to determine how they could be applied.

[14] This does not imply that all decision-makers will have to reduce their emissions. The contribution of some industries may come from reducing emissions elsewhere. By making greater use of light-weight steel, aluminum and plastics, automobile manufacturers for example will increase their emissions while they enable car drivers to reduce theirs.

3. VIs to reduce or offset GHG emissions may support the delivery of apparently-unrelated public policy objectives (e.g., enhancement of agricultural soils).

The advantages of a supporting policy framework are perhaps most obvious where government is directly involved in a VI. A recent review of US federal programmes to convince businesses to reduce pollution voluntarily concluded that most government initiatives have had minimal benefits either for environmental protection or for industry participants (Davies and Mazurek, 1996). The main lesson from the study is the difficulty government has in creating strong incentives for industry action without a supportive policy context. While a government-sponsored VI can be authorized through non-statutory means, ideally, it should be authorized by legislation. This does not necessarily require detailed legislative provisions. However, as Davies and Mazurek (1996: p. 3) concluded in their review of US environmental VIs:

> The lack of a statutory basis for environmental initiatives or programs always foreshadows difficulty. ... civil servants tend to spend their time - rightly - on programmes grounded in law.... Also, without a legal mandate, decisions must be made by some sort of consensus, which is rarely efficient or effective in an atmosphere as contentious as environmental management.

A supportive policy framework can also help where government is not directly involved in VIs. Through measures such as market-enhancing policies, supporting public awareness or the setting of minimum standards (to discourage free-riders), governments can create an enabling context to support all forms of voluntary action.

A supportive policy framework can exist at different scales. Where the goal is modest or easily achieved, the degree of public support required, including incentives, may be similarly modest. Where the goal is very ambitious, as is clearly the case for climate change, the need for policy support will be correspondingly greater. Where the goal is ambitious and other policy instruments (e.g., a carbon tax or a cap and trade regime) are socially unacceptable, the degree of policy support required to drive aggressive voluntary action can be expected to be higher still. In the current context, we believe that voluntary action to reduce GHG emissions or sequester carbon will require comprehensive and well thought-out government support.

5.2 Possible Elements of a Policy Framework

There are many possible elements to a policy framework that would support voluntary action. Most, if not all these elements, would likely figure in any climate change policy framework; even one that did not emphasise voluntary action. The goals of such a framework could include:

- helping determine when VIs are an appropriate tool to use and their core design elements;
- promoting and recognising voluntary action;
- determining when and how governments should support specific initiatives;
- removing policy barriers and identifying synergistic policy commitments;
- developing a mechanism to evaluate progress; and
- building public confidence in the VIs being pursued.

5.2.1 A Consistent and Transparent Approach to VIs: Clear Groundrules

Establishing the groundrules under which all parties can undertake voluntary action must be an important element in any strategy promoting VIs. Such rules would indicate the conditions governments will attach to incentives where these are provided. They would also enhance public trust in VIs by clarifying for everyone the roles of governments, participants and third parties as well as by reducing the uncertainty confronting investors.

These groundrules could include:

- overall objectives to be met (and targets and schedules);
- principles (e.g., progress in one area should not create a problem in another; transparence and accountability);
- minimum design elements, such as reporting requirements (and level of verification); and
- the nature and magnitude of the incentives available.

Perhaps the most important groundrule concerns credit for early action. One of the key incentives government can provide to organizations that are ready to reduce their GHG emissions voluntarily is to undertake to exempt them from other policy measures provided they commit to measurable, reported and verifiable emissions reductions. If the federal and provincial governments wish VIs to proceed prior to this issue being resolved, they will have to rely on other incentives to motivate action. These incentives may have to be large given the importance industry attaches to receiving credit for early action.

5.2.2 Leadership

As a society, we are asking all decision-makers to do voluntarily (i.e., reduce GHG emissions or sequester carbon) what in most cases they would not chose to do, at least not yet. While some will reap rewards from these actions (e.g., cost savings, new market opportunities for GHG-reducing goods and services), many will need to be encouraged and recognised if they are to initiate and maintain the effort expected of them. Visible, sustained, political leadership is required to demonstrate that climate change is an important element of the national agenda and to encourage other decision-makers to participate in this collective endeavour.

VIs already under way demonstrate the importance of the on-going, explicit, commitment of senior managers to their success. Senior management support helps reinforce awareness of the changes to be made, overcome institutional obstacles and motivate action. The sustained interest of senior managers is particularly important when the changes to be made are long term. If this private leadership is important within a specific programme, sustained, visible, leadership by elected representatives, senior government officials and opinion leaders will be required to persuade decision-makers to act to control their GHG emissions when many remain sceptical of the need to do so.

Such leadership can take several forms, including:

- setting of societal goals and challenges. The experience of other voluntary programmes highlights the need for clear, measurable, goals that focus collective effort and mobilise creative energy. In industrial health and safety, it may be "no fatalities" or "no lost-time accidents". Similarly, in quality management, it may be "zero defects". A Canadian climate change strategy would benefit from articulating specific goals that encourage progressive changes in behaviour and the achievement of emissions reductions targets;

- setting the example (most Canadian governments and many individuals are already leading by example by reducing their own energy use, increasing the fuel efficiency of their transportation fleets and making greater use of less energy-intensive products);
- making resources available (government energy efficiency spending is increasing after several years of decline);
- procurement policies supporting products with low emissions;
- cooperating with other jurisdictions; and
- expressing moral and political support and commitment (e.g., speeches, policy statements).

Other decision-makers, such as industry and municipalities, will also have an essential role to play in providing this leadership. Without the explicit support of its CEO, change will not occur within an organization. Corporate decision-makers who have made this commitment to action may have to reach outside their organizations and provide leadership through:

- applying peer pressure among laggards;
- recruiting new participants to various voluntary programmes; and
- transferring skills, systems and technologies to abate GHG emissions.

5.2.3 Public Awareness and Outreach

The complexity and pervasiveness of the challenge suggest that education and awareness raising should be an explicit element of a climate change strategy. Grass-roots support and participation will be essential in sustaining social change of the magnitude required to reduce GHG emissions. The purpose of a public awareness and outreach programme, therefore, should be two-fold:

- to promote a sense of responsibility among all decision-makers for doing something about climate change; and
- to provide them with the analytical tools they need to identify the most cost-effective actions.

Governments can help attenuate the effect of existing barriers to voluntary action to reduce or offset GHGs by:

- providing basic information about the causes and anticipated effects of climate change;
- explaining why it is in Canada's and their interest to act; and
- informing decision-makers of possible actions they can take to reduce GHG emissions or sequester carbon.

Demonstration projects, whether of technologies, methods or policy instruments, should therefore figure prominently in such a strategy.

Canadian governments have already recognised the need for increasing public awareness of climate change issues and manage a variety of programmes to this end. Governments, however, have not implemented a concerted "action-oriented education campaign on climate change" to which they committed in 1994 as part of NAPCC. Delays in implementing this campaign will make it more difficult to build the public support needed to encourage aggressive voluntary action because it typically takes several years before increased awareness translates into behaviour changes.

While the emphasis of this section is on government policy support, all opinion leaders, including large corporations, industry associations, NGOs and even individuals will have a role to play in raising awareness of climate change issues. PetroCanada, for example, asks its suppliers to register with the VCR. In the US, the Environment Defense Fund is identifying the "carbon

liabilities" of various US utilities.[15] For their part, consumers could ask their suppliers what steps they are taking to address climate change.

A better informed public will not only take steps to reduce its own GHG emissions but will also be able to demand better performance from large emitters. Public awareness could therefore have a positive synergistic effect.

5.2.4 Fiscal Measures

While many decision-makers will voluntarily reduce or offset their emissions because of the opportunities they perceive, many more are likely to be driven by the promise of fiscal incentives. The current political climate may not favour the aggressive use of fiscal measures in a GHG abatement strategy. Canadian governments, however, have already introduced a number of modest measures, such as accelerated capital cost allowances (CCA) for certain renewable and energy conservation equipment, the exemption of excise taxes for alternative transportation fuels, and various grant and contribution programmes to promote renewable energy and energy efficiency investments and a range of programmes in the agricultural sector to retire marginal lands from production.

A list of possible additional financial incentives to motivate voluntary action by corporations and individuals would in all likelihood be very long. It could include additional CCA reforms for certain investments, investment tax credits and technology commercialisation grants. These could be awarded in a number of different ways, including on a competitive basis, where firms would bid for grants or tax incentives on the basis of GHG abatement plans.

It has also been suggested that the government could cut corporate taxes for companies that reduce their GHG emissions by a set percentage. Alternatively, governments could tax emissions that exceed set targets and rebate the proceeds to companies that surpassed them.[16] In every case, the purpose of such fiscal measures would be to accelerate the commercialisation of existing or new technologies in order to increase energy efficiency, reduce GHG emissions or increase carbon sequestration.

More controversially, the government could take steps to have market prices reflect environmental externalities by taxing energy use. Where energy taxes are imposed, their revenues can be recycled to the contributing sector or used to reduce other taxes. The proceeds of a Swedish NOx charge on utilities, for example, is redistributed within the sector to the firms that are most energy efficient, thereby providing a powerful driver for continuous improvement. Other jurisdictions have used direct taxation measures to motivate voluntary reductions of GHGs, sometimes as a threat (in New Zealand, the government initially announced that it would impose a carbon tax if industry VIs were ineffective), sometimes as complement (in Denmark, some industries that are subject to energy taxation are granted a partial tax rebate if they agree to implement profitable energy efficiency measures identified by an independent auditor).[17]

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[15] The Public Education and Outreach Issue Table recommends a multi-pronged awareness-raising strategy whose corporate component would include business communication to, and training of, their own employees, educating the public and modelling positive actions to other companies and communities.

[16] See "An Energy tax for Business?" speech delivered by Rodney Chase, President of BP Amoco, to a meeting of the Fabian Society, London, January 13, 1999.

[17] In its 1999 budget, the British government proposes a similar measure for British industry.

Even if fiscal incentives do not actively promote investments in GHG abatement, they should at least not disadvantage them. A federal study of the tax treatment of competing energy investments concluded that, although there is no "pronounced" tax bias in favour of non-renewable energy supply compared to renewable supply, certain energy efficiency investments and investments in direct heating from renewable sources are "disadvantaged by the tax system" (NRCan, 1996, p. 29). Similarly, agricultural subsidies can result in the clearing of land or the application of agricultural practices that can reduce the potential of the land to sequester carbon. If carbon sequestration is to be a part of Canada's GHG emissions management strategies, then those instruments that work against this objective need to be reviewed.

5.2.5 Regulations

Regulations can play a variety of important functions in establishing a policy framework conducive to enhanced voluntary action:

- a credible regulatory threat is a key driver of voluntary action. The introduction of regulations, even in draft form for comment, can dramatically accelerate public awareness of an issue and the government's intent to change behaviour.
- Regulations may be required to address the problem posed to some VIs by free-riders. While strong industry associations and market forces may in some cases suffice to eliminate free-riders, government regulation may be required to ensure that all concerned parties participate fully and fairly in reducing GHG emissions.
- Regulations can also establish a framework for voluntary action by creating or helping structure markets.[18] A regulatory framework, for example, could strengthen voluntary emissions trading activities.
- More fundamentally, regulations may be required to address some of the basic behavioural issues that underlie Canada's GHG emissions. Action (whether voluntarily or in response to regulations) to enhance energy and material efficiency may not prevent *net* increases in emissions, for example. Without regulations, enhanced energy efficiency may simply encourage enhanced consumption of GHG-intensive products, leading to an overall increase in energy use and GHG emissions.[19] In addition to the kind of fiscal measures described above, regulatory options to encourage voluntary GHG reductions could include both measures that directly address product design (e.g., by regulating the use of certain carbon-intensive materials and processes) and those that influence the environmental attributes of products indirectly (e.g., pollution prevention planning requirements, and user pay and extended producer responsibility policies that increase the costs of releasing wastes into the environment).

Conversely, the success of individual VIs is likely to depend in part upon what assurances governments will be able to give to participants that their meeting the goals of the programme will shield them from the application of negative fiscal or regulatory measures.

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[18] Regulations could also play a useful role in promoting carbon sequestration on private lands. In most cases, landowners will be sequestering carbon not to address their own emissions but someone else's. In these cases, regulations governing monitoring and reporting requirements of carbon sequestration programs could be required.

[19] In his famous text, *The Coal Question*, (1865) Jevons observed that "the reduction of the consumption of coal, per ton of iron, to less that one-third of its former amount, was followed, in Scotland, by a tenfold increase in total consumption, between the years of 1830 and 1863, not to speak of the indirect effect of cheap iron in accelerating other coal-consuming branches of industry."

5.2.6 Indirect Supporting Measures

While all the elements above are directly related to a GHG abatement strategy, there are several indirect measures that governments can take to support voluntary action. These include:

5.2.6.1 Market-enhancement policies

Sound information available to all is a prerequisite to a smoothly-functioning market. The government already takes measures to increase consumer information (through regulation in the case of the energy efficiency of certain consumer products and voluntarily in the case of Environmental Choice) and penalise deceptive and misleading advertising. These measures are enhanced by mandatory disclosure requirements of self-regulated industries, such as the financial market and voluntary reporting by many corporations (e.g., corporate environmental reports). In the energy field, the federal government has been implementing programmes for many years designed to promote wise energy use (e.g., EnerGuide and fuel consumption ratings for new automobiles).

Through their procurement policies, governments can help create markets for infant technologies (e.g., commitments to purchase "green" electricity). Similarly, programmes supporting R&D, technology demonstration, establishing performance benchmarks, training and conferences can help accelerate technology penetration.

Creating a market for trees planted through afforestation provides another example of how governments could encourage voluntary action. Currently, lands that are best suited to afforestation tend to be located in regions where either fibre is not in short supply or are a long way from potential customers. Helping to create a market for afforestation products (such as ethanol) would stimulate investment.

5.2.6.2 Marketplace framework laws and policies

Marketplace framework laws (such as the *Bankruptcy and Insolvency Act*, the *Canada Business Corporations Act*, the *Competition Act* and the *Consumer Packaging and Labelling Act*) define broad rules for marketplace behaviour across all sectors of the economy. They facilitate transactions between private parties, help ensure a fair and efficient marketplace, and promote an economic climate conducive to continued innovation and growth. Framework laws can also reduce the need for direct government intervention in the marketplace. As Industry Canada's 1997 Sustainable Development Strategy emphasized, "the micro-economic rules that govern the way businesses operate ... play an important role in influencing the marketplace" (p. 9).

It would therefore be appropriate to ask:

- to what extent does a given marketplace framework law directly promote or impede Canada's climate change objectives? and
- to what extent does the law support or impede other attempts to achieve those objectives (e.g. through environmental legislation, voluntary codes, etc.)?

5.2.6.3 Productivity policies

Canada's apparent failure to improve its productivity as fast as that of its major trading partners is emerging as a major policy concern. The World Business Council on Sustainable Development,

the International Institute for Sustainable Development, the Rocky Mountain Institute, the Wuppertal Institute and others have identified the important linkages between energy efficiency and productivity. To the extent that a supportive investment climate encourages innovation and technology development and acquisition, it will increase productivity and should increase the efficiency with which energy is used, thereby contributing to Canada's climate change agenda.

5.2.7 Policy Coherence

Not all existing government policies support the reduction of GHG emissions. Not surprisingly, some policies and programmes developed for other purposes may pose barriers to a GHG abatement strategy. Some land use planning decisions, for example, may encourage urban sprawl and increase automobile use; decisions to reduce the regulatory burden in the housing sector by removing energy efficiency considerations from the building code may increase energy consumption; policies to reduce the emission of air pollutants may increase energy use.

Some environmental regulations may also inhibit the development of VIs to reduce or offset GHG emissions. Some environmental licensing regimes, for example, inhibit the development of new technologies and, as an unintended consequence, may act as a barrier to voluntary action to reduce GHG emissions. Some permitting processes and standards discriminate against the development and use of new, potentially environmentally preferable, technologies. Various Canadian and American rules currently apply the same requirements to hazardous waste that is being recycled or reused as to hazardous waste that is being treated or disposed of (CCME, 1997). Laws that impose stricter standards on the performance of new facilities may impede innovation by favouring retrofitting of old production processes. Similarly, laws that impose stricter standards on the performance of new products can pose problematic hurdles, particularly for smaller companies – which are Canada's biggest source of innovation. Even when legal standards do not discriminate, studies suggest that regulators often tend to impose more stringent requirements on new technologies with which they are less familiar. Removing barriers to energy efficiency, recycling or investing in new technologies should therefore be an important element of a policy framework supporting voluntary action (Industry Table Foundation Paper, 1998).

A policy framework supporting cuts in GHG emissions will have to overcome such barriers and ensure that policy signals consistently point in the same direction and, where possible, reinforce each other. The effort required to achieve and maintain this policy coherence is likely to be significant. An aggressive afforestation programme to combat climate change, for example, could lead to thousands of hectares of hybrid poplar plantations – a result inconsistent with the government's commitments under the Convention on Biological Diversity. At the federal level, the preparation of departmental Sustainable Development Strategies with its attendant examination of barriers to sound environmental practices is an example of how to increase policy coherence to protect the environment.

5.3 Summary: The Need For a Coherent Policy Framework

The purpose of the discussion above is not to recommend the precise content of a particular policy framework since there are many variations possible depending both on the particular suite of VIs selected and on the prevailing political and economic circumstances. Instead, this section emphasizes that some such framework is essential if we are to rely on VIs to make a significant contribution to GHG management in Canada. Just as individual VIs should include a mix of

"carrots and sticks" to motivate action and penalise inaction, an overall policy framework could establish broad positive and negative drivers that support voluntary action. Such a framework is required because of the scope of the challenge and the need to engage all decision-makers in a sustained effort over a long period of time.

The core features of a policy framework at both the federal and provincial levels should include a mix of information, exhortation, regulatory and fiscal levers. In addition, it should seek to increase policy coherence in order to eliminate any barriers to voluntary action and create synergies among all relevant government programmes. Such a framework will be most effective if it is coherent among the federal, provincial and municipal levels: policies at one level should reinforce policies in the other jurisdictions. There are many opportunities for federal-provincial-municipal collaboration in establishing such a framework.

A policy framework to support voluntary action to control GHG emissions will have to evolve over time to suit the situations in the various jurisdictions in Canada, if only because some of its elements could be put in place faster than others and may be more appropriate for some jurisdictions than others. The design of certain elements can also be expected to evolve as circumstances change. An awareness-raising programme, for example, could evolve into more action-oriented programmes once a certain level of awareness has been reached. Similarly, efficiency standards could be raised over time.

6. Second Element: Supporting Infrastructure

The elements of the "Policy Framework" described in section 5, above, are intended to encourage voluntary reductions of GHG emissions and voluntary carbon sequestration activities, and to establish a set of "groundrules" around such activities. In addition, a successful Canadian strategy to abate GHG emissions is likely to require the creation of a number of cross-cutting measures or tools to support individual VIs. This infrastructure will have to exist at all levels.

At the ***government*** level (section 6.1), these should include:

i) enhanced awareness and outreach programmes such as CIPEC;
ii) emissions registries;
iii) a system of credit for early action;
iv) a voluntary emissions trading programme;
v) rules concerning offsets and sequestration;
vi) a concerted focus on the municipal level; and
vii) enhanced institutional capacity.

At the ***business*** level (section 6.2), these tools will need to include environmental management systems (EMSs), the setting of benchmarks and codes of practice and the application of life-cycle analysis.

At the level of the ***individual*** (section 6.3), the tools will need to include:

i) better and more information on purchasing (e.g., EnerGuide) and operating decisions (e.g., detailed breakdowns of utility bills); and
ii) financial mechanisms (e.g., allowing individuals to borrow against their RRSP or RESP funds to finance energy-efficiency investments, with the loans to be repaid back through energy savings).

6.1 Government Level

6.1.1 Promotion, Awareness and Outreach Programmes

The most important government energy efficiency programme aimed at the manufacturing and mining sectors is the Canadian Industry Program for Energy Conservation (CIPEC), a voluntary, industry-driven, programme started in the 1970's as a result of the first oil price shock. CIPEC now reaches 20 industry sectors representing almost 90 percent of secondary industrial energy demand. Since 1991, the 3000 companies participating in CIPEC have achieved average annual energy intensity gains of two percent and have collectively effectively stabilised their CO_2 emissions at 1990 levels.

As CIPEC's secretariat, NRCan supports the work of the sectoral task forces and CIPEC's governing bodies by funding training workshops, publishing newsletters and targeted energy efficiency guides, tracking progress and encouraging cross-sectoral exchanges of information and experiences. NRCan is also developing a benchmarking programme to inform companies of best practices and motivate them to continue improving their performance.

As a successful industry-government partnership, CIPEC will have an important role to play in any Canadian strategy to reduce GHG emissions, particularly one based on voluntary action. CIPEC's ability to promote higher performance from its members, however, is restricted by the low rate of return many energy efficiency investments yield. Flat energy prices, the small share of energy in production costs in many sectors, the lack of awareness of energy efficiency opportunities (a result of the preceding factors) and the absence of credit for early action all inhibit more aggressive investments in energy efficiency at this time. Overcoming these barriers could involve a combination of approaches, including additional resources to CIPEC's secretariat to continue raising awareness and provide enhanced technical services, and the establishment of innovative fiscal measures to reduce the up-front costs of energy efficiency investments (see section 5.2.4 above).

A more radical restructuring of CIPEC (involving, for example, mandatory energy audits, the negotiation of energy efficiency targets – sectors now set their own targets -- and the augmentation of NRCan's technical capacity to support CIPEC at the company level) is easily conceivable,[20] but would strain the programme's current voluntary model. Given the diversity of the sectors participating in CIPEC, it is likely to be more economically efficient to deliver additional measures at the sectoral level through specific VIs or other instruments.

[20] For several years, CIPEC has worked with Statistics Canada and the Canadian Industrial Energy End-Use Data Analysis Centre at Simon Fraser University (SFU) to assess the energy efficiency potential in various industrial sectors. The Netherlands, , has established a similar independent, technical, Agency for Energy and the Environment (Novem). to assess the economically-available energy efficiency potential in industry sectors., Whereas SFU relies primarily on modelling to estimate efficiency potential, Novem often works in conjunction with the industry association. This inventory serves as the basis for negotiating a target for energy efficiency improvements in that sector with the government.

6.1.2 A Comprehensive Public GHG Emission Registry

The VCR was launched in 1995 and incorporated as a private-public partnership in 1997. It now operates as a stand-alone, not-for-profit corporation, drawing two-thirds of its operating funds from the private sector and the balance from the federal and provincial governments. It includes over 900 participants who together represent over 78 percent of the opportunity for business and government operations to reduce GHG emissions in Canada. Quebec has created its own version of the VCR, EcoGESte.

VCR Inc.'s mission is to "provide the means for promoting and recognizing the effectiveness of the voluntary approach in addressing Canada's climate change objectives". EcoGESte's mission is similar. Both organizations are modestly financed and possess accordingly few levers to motivate cuts or offsets in GHG emissions. As a registry for climate change-related voluntary action, however, VCR Inc. and EcoGESte could provide both a common reporting venue for all industry- and government-based voluntary programmes to reduce or offset GHG emissions and a platform for recognising performance (VCR Inc. already offers leadership awards). VCR Inc. and EcoGESte have already been designated as the venue to register emissions baselines and credits for early action. These roles make the VCR an essential element of the overall infrastructure to support individual VIs.

In time, the VCR and EcoGESte should become integrated to Canada's national emissions inventory (which will require all parties to adopt consistent measurement protocols). They would then be able to document the impact of individual VIs in reducing GHG emissions.

Action will also have to be taken to ensure that reports to the registry are of consistent high quality. The depth and quality of the reports that have been submitted to VCR Inc. to date have varied significantly, a fact that has adversely affected the credibility of the reporting system as a whole (VCR Inc., 1999). VCR Inc. has taken several steps to improve the quality of this system by:

- initiating a Champion Reporting System with three levels of reporting (gold, silver and bronze). Registrants will earn the right to use a VCR Inc. logo that corresponds to the level of reporting they have achieved;
- raising the bar for posting on the registry to a minimum of the expression of senior management support, a commitment to regular reporting and a base-year calculation. VCR Inc. will work with existing registrants to assist them in meeting the new requirements;
- setting up an on-line registry mechanism giving registrants an opportunity to update their reports on-line; and
- publishing a comprehensive Registration Guide to provide detailed guidelines to reporting and a link to the emerging baseline protection guidelines.

In addition, several industry associations have helped their members register for the VCR by developing sector-specific reporting guidelines for their members and, in some cases, by lending staff time.

The main reporting issues confronting VCR Inc. are increasing participation in the highest reporting level (gold) and verification. At present, VCR Inc. provides limited technical support to help registrants upgrade their reporting and would require additional resources to be able to do more. Making incentives conditional on gold level reporting, however, may be more effective in encouraging organizations to increase the rigour of their reporting than adding staff to VCR Inc's office. Industry associations can also continue to help their members. Large organizations can

base their procurement criteria in part on their suppliers improving the quality of their reporting to the VCR. Because it relies on exact accounting, any system of credit for early action would also force higher reporting standards.

Current reporting is based on self-declaration, and it is possible for registrants to achieve gold level reporting under the new reporting guide even without an actual verification of their claims (although the reports have to be verifiable). Some form of verification will be required to enable VCR Inc. to discharge its mandate as the national registry for credits for early action, to support voluntary trades and offsets as well as to support most incentive programmes. Verification would also enhance public trust in the actions claimed by registrants.

Several options exist on how verification could be undertaken, including:

- internal audits by the registrant, made available on demand;
- a customised third-party verification process;
- a third-party verification process according to an accepted standard (e.g., CSA or ISO); and
- verification by the entity providing incentives.

Verification can be costly. In addition, any requirement for verification needs to strike a balance between the confidentiality needs of the industry and the needs of the public, trading entity (in the case of a carbon credit trade) or organization providing incentives. Verification can be introduced gradually and progressively tightened as required.

A registry is an example of the hybrid nature of many VIs. While individual parties would choose voluntarily whether they wished to reduce their GHG emissions, once they decided to become part of a government-sanctioned programme, the reporting and verification requirements they would have to meet should be mandatory.

6.1.3 Credit for Early Action

While governments could administer a credit for early action regime directly, an arm's length agency that included industry and NGO representatives on its management board might enjoy greater public legitimacy.

Whichever model is chosen, the creation of such a regime is likely to require legislation to authorise it. The nature of this instrument would require the development of an elaborate set of rules even if participation were purely voluntary. Among other things, these rules would cover the calculation of baselines, what actions would be considered eligible for credit, the reporting obligations of the participants, performance incentives and the conditions surrounding trades.

The main incentive proposed by the Canadian Early Emission Reduction Program Collaborative to encourage participation is a government commitment to exempt participants from additional policy requirements as long as they met their obligations (an arrangement similar in nature to the regulatory flexibility agreements described in Table 7.2.2). Such a commitment could be formalised in a series of contracts or covenants between the government and participants.

6.1.4 Voluntary Emissions Trading

The Kyoto Protocol allows for the international trade of emission reductions credits. At least one country (New Zealand) is proposing to make (mandatory) emissions trading/a carbon charge the core of its climate change strategy. If Canada wants to participate in such an international programme, it will likely have to create a domestic one first. A voluntary model has been described as "a logical first step" to a national or international trading regime.

There are several models of domestic emission trading regimes (National Round Table on the Environment and the Economy, 1999). Among the key issues to be resolved in establishing such a regime are:

- providing incentives to create credits by identifying potential uses for them;
- establishing criteria and procedures for credit creation; and
- establishing measurement, verification and reporting procedures, including a registry for credit creation and trades.

The Greenhouse Gas Emission Reduction Trading (GERT) Pilot and the Pilot Emissions Reduction trading (PERT) initiatives are testing the design issues related to Canadian emissions trading regimes. In addition, some firms (e.g., TransAlta, BP/Amoco) are conducting internal trades as part of their GHG abatement strategies.

6.1.5 Rules Concerning Offsets

Under the Kyoto Protocol, Canadian GHG emitters have the opportunity to offset their GHG emissions by investing in developed countries in Joint Implementation and by participating in projects in developing countries through the Clean Development Mechanism.

There is an opportunity to utilize offsets domestically in order to engage SMEs and individuals in Canada's GHG emissions reduction strategy. Two of the most significant barriers to GHG emissions reductions among SMEs and individuals are their lack of awareness of their emissions and their limited capacity to take advantage of available opportunities to participate in Canada's GHG abatement strategy. While governments can help overcome awareness and technical barriers through programmes such as CIPEC, the transaction costs entailed with reaching out to thousands of SMEs and individuals are substantial, and it will be difficult and costly for government to attempt to engage a significant number directly.

Governments can provide opportunities for enhanced voluntary action in this area by sharing the responsibility for reaching out to SMEs with industry associations and leading companies. One way of doing this would be to create a mechanism through which sectors or individual companies can offset part of their own emissions by improving the GHG emission performance of SMEs. Such a mechanism would assist in transferring technology and management systems to SMEs and, in return, the sector or investing company would receive a share in the emissions reductions obtained. This would encourage greater technology transfer within industry and reduce the need for direct government involvement. The benefits of a domestic offsets program are not restricted to GHG emissions reductions. Participating SMEs could also experience improvements in productivity and competitiveness (which might be shared by the investor, depending on the nature of the partnership).

Another option would be to establish groundrules for programmes intended to sequester carbon – through afforestation or improved agricultural practices, for example. In these situations, GHG emitters can augment government resources available to, or directly support, landowners willing to participate in such activities. These types of programmes yield a significant array of benefits (indeed, they have been promoted for years in Canada in advance of concerns over GHG emissions) and thus the opportunities for partnerships and "win-win" situations may be substantial.

Flexibility and innovation will be key requirements of any offset or sequestration mechanism in order to encourage sectors and leading companies to take full advantage of the range of opportunities this approach presents. However, an offset or sequestration mechanism will need to meet minimum measurement, monitoring and verification criteria in order to prevent abuse. Further, it will be necessary to ensure that offset or sequestration opportunities not divert attention away from the need to lower GHG emissions at source.

6.1.6 Municipal Initiatives

More so than the federal, territorial and provincial governments, municipalities manage extensive operations that consume a lot of energy (e.g., public lighting) or generate GHG emissions (e.g., methane from landfill sites). They also account for about a third of all public investment in Canada. In addition, municipalities can control or influence the energy use of third parties through their zoning regulations, permit conditions, taxes, business development and other decisions. In a society that is highly urbanised, municipalities exert considerable leverage in how energy is used and, therefore, have an important role to play in a national climate change strategy.

More than sixty Canadian municipal governments have committed to reducing GHG emissions from their operations by 20 percent below 1988 levels by 2005. In an issue for which political commitment to action has been rare, this leadership represents a very significant opportunity to leverage measurable cuts in emissions. The options municipalities are considering include landfill gas recovery, waste diversion, emission reductions from their operations, community greening strategies and community energy planning.

Municipalities, however, also face a number of constitutional, legal, information and financial barriers in implementing these options. Although circumstances vary across the country, these barriers include lack of jurisdiction to apply user fees or energy codes; the absence of inventories, emissions forecasts and mitigation option assessments; lack of expertise and analytical capacity; financing barriers such as constraints on borrowing capacity or types of expenditures that can be capitalised. Because of their constitutional responsibilities over municipalities, provincial and territorial governments will have a major role to play in removing most of these barriers. Joint federal-provincial-territorial municipal programmes to fund infrastructure (e.g., by establishing revolving funds) could also make a contribution to alleviating some of these barriers. Overcoming these barriers should be a major priority of both federal and provincial climate change strategies.

6.1.7 Government Capacity Issues

As stated in Section 5.1, government officials, rightly, tend to assign priority to requirements that are grounded in laws and regulations. Although a supportive policy framework will provide VIs with greater legitimacy within government, the effective promotion and implementation of VIs will also test the existing capacity of many government agencies at the federal, provincial and

municipal levels. Governments will need to be more active than they have been to date on this issue, and this will have programme, budgeting and perhaps also structural implications. Although the precise nature of these implications will depend largely on what specific VIs the government promotes and how, it is possible to make some general observations.

The design, negotiation and monitoring of a multitude of VIs with industry and other governments will require an allocation of skills and resources that is beyond the current capacity of any existing government agency. It will also require the breaking down of jurisdictional prerogatives and entail a seldom-achieved level of interdepartmental and intergovernmental cooperation.

The shared approach to problem-solving necessitated by VIs will also present new challenges. While some government agencies have developed the skills to operate in a partnership-oriented environment, this approach will need to become the norm. If voluntary action is to become more widespread, governments may have to adjust to the fact that they will not have the level of influence or control that they have enjoyed in the past. To a greater degree than ever before, government agencies will rely on others to ensure the appropriate level of monitoring, verification and reporting of progress. Governments should set the groundrules for these activities – particularly for the circumstances in which they will participate – as discussed elsewhere, but they will increasingly become a facilitator rather than an enforcer or referee.

An emphasis on VIs will also challenge the tendency to allocate resources to regulatory measures. The incentives required to secure meaningful performance in reducing or offsetting GHG emissions will be substantial and the transaction costs of many VIs may equal or exceed those associated with a regulatory approach. Not all of these efforts are likely to produce results and therefore greater risk is assumed in allocating resources to support the development and implementation of VIs. That may test traditional assumptions, but if an appropriate level of resources is not provided to VIs, they will not be credible with potential participants or the public; and they will not produce results.

So, the challenge to government agencies is to move toward a more partnership-oriented and facilitative role in promoting action while still ensuring that the desired results of voluntary action are secured. To do so, government will have to acquire or reallocate the human, technical and financial resources required.

6.2 Infrastructure Requirements for Businesses and other Organizations[21]

Like governments, businesses and other organizations participating in VIs will also face infrastructure challenges. Some of these relate to the ability to address the technical aspects of climate change VIs and others to the cultural shift required to undertake voluntary action. Some of the specific issues that will have to be addressed include:

- the creation of emission baselines and tracking systems ("you can't manage what you don't measure");
- the burden that raising awareness about climate change, employee training and negotiating and implementing VIs will place on technical, human, information and financial resources, particularly for SMEs;

[21] See Section 7.2.4 for a longer discussion of company codes and initiatives.

- mechanisms to support inter-firm sharing of best practices;
- working with external stakeholders; and
- mechanisms for public reporting to meet the requirements of transparency so as to ensure that VIs are credible.

Several of these challenges can be addressed through environmental management systems (EMS). The International Organization for Standardisation (ISO) defines an EMS as "that part of the overall management system which includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy." An EMS, in other words, helps an organization manage the environmental issues it faces.

The ISO has published a series of environmental management standards. These, and other similar voluntary standards developed by industry associations and individual companies, establish among other things data collection and handling procedures, data quality indicators and reporting requirements. Canadian governments (e.g., Ontario) promote the greater adoption of EMSs by industry on the premise that their systematic approach to management can improve environmental performance.

EMSs are therefore important building blocks for most environmental initiatives, and are increasingly used by industry to manage environmental risks and improve performance. In the case of GHGs, they can provide a framework for calculating emissions, setting objectives, identifying actions, tracking performance and auditing results. A greater penetration of EMS in Canadian industry would therefore support participation in, and the performance of, climate change-related VIs.

6.3 Infrastructure to Support Action by Individuals

As described further in Section 7.3.7, individuals will have an important role to play in any climate change strategy based on voluntary action. Despite good intentions, however, few individuals have the resources or the experience to develop VIs on their own. Governments can lead the development of VIs aimed at individuals (e.g., the ongoing drinking and driving campaigns); they can negotiate their delivery with producers (e.g., the blue box system); or they can provide support to NGOs and community groups (e.g., many of the locally based and run pollution prevention and clean-up initiatives sponsored under the federal-provincial remedial action programs).

Governments can also play four important roles in providing information to consumers:

- First, governments can inform consumers about the environmental, social and economic implications of their own actions or behaviour. There are currently several public education and outreach campaigns supported by the government, such as AutoSmart, Reno$ense, EnerGuide and R-2000. In addition, governments are developing tools, such as a CO_2 calculator to enable consumers to manage the GHG impact of their lifestyle;
- Second, experience with pollution prevention and toxics use reduction programmes in Europe and the US indicates that governments can also create powerful levers for change by forcing industry to report its environmental performance publicly[22] (see also Section 5.2.6); and

[22] While there is no similar documented evidence in Canada about the impact of the mandatory public reporting provisions of the National Pollutants Release Inventory, anecdotal evidence suggests that it, too,

- Third, governments can help ensure the credibility and comparability of industry claims about the relative performance and impacts of their products. Governments can sponsor eco-logo programs and can help with the development and dissemination of analytical tools that allow for consistent measurement of relevant aspects of environmental performance.

NGOs have for many years raised public awareness of climate change issues and distributed information aimed at supporting individual action. NGOs, however, also face capacity issues in enhancing the reach of their campaigns. Canadian businesses and governments will need to help NGOs overcome these limitations in order to ensure the success of any strategy to involve consumers in taking individual action to reduce GHG emissions.

Governments can also use economic instruments to assist consumers in taking voluntary action. Modifying RRSP rules to allow homeowners to borrow from their RRSP for energy efficiency investments in the home is one example. Not taxing bus passes provided by employers is another. In a related vein, retrofit programmes administered by utilities or energy service companies which finance home energy efficiency investments out of the savings realised are another example of the financial measures that will be required to encourage and support individual voluntary action.

7. Third Element: Specific Voluntary Initiatives

The third component of a strategy to enhance voluntary action on climate change is the implementation of discrete and well-designed VIs in every sector of the economy. The opportunities to employ VIs either to reduce GHG emissions directly or to offset them through the sequestration of carbon are substantial.

As stated earlier, all decision-makers will ultimately need to be part of a national implementation strategy. Designing and implementing VIs to include most of these decision-makers is likely to be time-consuming, and therefore priority needs to be given to identifying areas in which VIs are most likely to be most credible and effective.

Section 4 presented a preliminary analysis of the various opportunities for enhancing voluntary action to reduce or offset GHG emissions in Canada. The following section builds on that analysis by identifying, describing and evaluating various different types of VIs. Section 7.1 identifies 14 generic VIs and presents an analytical framework for evaluating potential VIs. Section 7.2 illustrates how the framework can be used by applying it to two forestry-related VIs . Section 7.3 then presents a more rudimentary application of the framework to seven "notional" VIs that the EVA Table believes offer significant potential to reduce or offset GHG emissions, but for which only preliminary data was available at the time this report was prepared. It is important to note that these VIs are provided as examples only and that they are in no way meant to exclude or deter other forms of voluntary action.

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has had a similar impact. Documenting NPRI's impact in this regard would yield insights that would be directly relevant to a climate change strategy.

7.1 Types of Voluntary Initiatives

There are many types of VIs that could be applied to reduce GHG emissions. These include:

- *Government stewardship initiatives*: This category of VI includes all programs developed by the federal, provincial, territorial and municipal governments to reduce GHGs from their own operations.
- *Government challenges*: These include both voluntary registry programs (e.g., the VCR started as a government challenge) and the various programs that encourage environmental leadership without relying on binding agreements (e.g., CIPEC and Climate Wise – which are cross-sectoral – and the US Motor Challenge, Green Lights, and Energy Star Transformers programs, each of which focus on different energy using devices).
- *Awareness-raising programmes*: These can include both public education and more targeted outreach programs.
- *Technical assistance programmes*: These VIs are technology-focused and aim to transform markets to accelerate the use and upgrade of a specified "best-practice" technology. Best practices include best, known technologies and management practices and adoption of newly developed but demonstrated products not yet in widespread use. These VIs can be government-led or industry-led. An example of the latter are energy service companies (ESCOs) that offer to finance the installation of energy efficient retrofits in return for a share of the resulting energy cost savings.
- *Technology innovation programmes*: These VIs focus on advancing the frontier of "best practice." Governments can use technical means and market-pull incentives to induce manufacturers or research institutions to make incremental innovations to existing designs. Alternatively, governments may aim to accelerate traditional R&D output by encouraging industry to voluntarily develop and commercialize advanced (i.e., breakthrough) technologies sooner than they would have done otherwise.
- *Collaborative efforts agreements* (also sometimes known as negotiated agreements or covenants): Firms are motivated to enter these agreements, in large part, by an expectation that the environmental leadership they display will be rewarded in the market. Examples include the Dutch agreements, the New Zealand agreements, U.S. Climate Challenge, and Australia's Greenhouse Challenge.
- *Regulatory flexibility agreements*: These allow companies or sector organizations to opt out of existing or future regulations or taxes in return for specified environmental performance commitments. Regulatory relief is revoked and sanctions (informal or formal) may apply to participants who do not honour commitments.
- *Labelling programmes*: These programs allow (or force) manufacturers to mark their products with labels certifying certain environmental attributes.
- *Voluntary product and process standards*: Both international (e.g., ISO, IEC) and national (e.g., CSA, ULC) product and process standards are ubiquitous. These standards may be developed by formal standards development organizations (SDOs) following recognized processes (accredited by the Standards Council of Canada or the ISO), by ad hoc industry consortia, or by NGOs.
- *Supplier challenges*: are requirements by governments or large corporate buyers of goods and services that suppliers and their products meet specified environmental attributes.
- *Sectoral codes and programmes*: Voluntary codes are "codes of practice and other arrangements that influence, shape, control or set benchmarks for behaviour in the marketplace." They are: a) commitments, b) agreed to by one or more parties, c) designed to influence, shape or benchmark behaviour, and d) intended to be applied in a consistent manner or to reach a consistent outcome.

- *Company-specific codes and policies*: Individual firms may articulate codes of practice or environmental policies either for efficiency improvement reasons or to distinguish themselves from their peers.
- *Company-NGO agreements*: industry may enter into agreements with NGOs that commit the industry to specified environmental performance targets in return either for NGO assistance or for NGO agreement not to publicly criticize the participating companies.
- *Company-community agreements*: local communities may enter into formal agreements with local industries for a variety of reasons, most of which lie outside of the community's direct scope of jurisdiction.

These generic VIs are described in more detail in Appendix Table 2. Each can have many variants. They are not mutually exclusive and a given decision-maker may be involved in more than one type of VI at a time. If many of these types are complementary (a company may have its own policy, participate in a sectoral code and also in a government-sponsored VI), they are not interchangeable: their effectiveness and credibility will very much depend upon the circumstances of their application (see section 4.1), and their specific design (see section 4.2).

Each of these VIs can be assessed using the framework described in Table 3, below.

Table 3: Common Framework for Describing and Analysing Potential VIs

Objectives and targets
- Fuel substitution? Increased efficiency? Carbon sequestration?
- Absolute cuts in emissions? Improvements in efficiency? Amount of carbon sequestered?

Participation
- Single company, sector specific or cross cutting?
- Characteristics of the types of sectors or actors that could participate effectively (numbers, size of organization, concentration, importance of imports and exports, etc.

Main design features
- How do participants join?
- How will free riders be addressed?
- Transparency and reporting features
- Designing an emissions baseline

Incentives for participation
- What are they?
- Who will provide them?
- How much will they cost?

Necessary or Desirable Supporting Measures
- Role of government (Regulations required? Fiscal measures required? Linkages to other programs required? Barriers to be removed? Reward/recognition program? Other?)
- Role of industry associations
- Others?

Feasibility
- Experience in other jurisdictions
- Stakeholder views

Potential Impacts
- Time frame to achieve results (Short, medium or long term)
- Cost (to participants, to government, to the public)
- Distributional impacts
- Competitiveness impacts
- Emission reduction potential (low, medium, high)
- Other environmental impacts (L,M, H)

7.2 Analysis of Forestry VIs

7.2.1 Afforestation Programs

The potential for afforestation to contribute to Canada's GHG emissions reduction strategy has been explored in depth through a series of studies undertaken jointly by the Sinks and Forest

Sector Issues Tables. Four of these studies examined the afforestation potential in different regions of Canada while a fifth looked at design and implementation options for a national afforestation program(s). This analysis is based to a large degree on the findings of these studies.

Afforestation can be undertaken for a variety of reasons and in a variety of ways. In its simplest form, governments can provide sufficient incentive to landowners to plant trees (with the level of incentive contingent on whether the area planted represents a change in land use). GHG emitters can invest in afforestation projects in order to secure the carbon credits they provide. Forest products companies (or other businesses, such as ethanol manufacturers) can also invest in plantations with their carbon sequestration value being an added, or side, benefit to that derived from the timber the project produces. Third parties can also promote afforestation, selling the resulting fibre in one market and the carbon credits in another. For afforestation to make a significant contribution to Canada's GHG emissions reduction strategy, it is likely that a large number of landowners are going to have to be persuaded to change existing land uses to afforestation and that will be the focus of this analysis.

7.2.1.1 Objectives

The objective of an afforestation program is to plant trees on lands that are (and have not been recently) forested. This activity can provide benefits as diverse as biodiversity conservation, soil stabilization and economic development depending on the number of trees planted, the species of tree selected and the disposition of the tree at maturity. It is unlikely, therefore, that any afforestation project will provide only carbon sequestration benefits or that carbon sequestration alone will be the objective of any project. In fact, Canada and other countries have long promoted and supported afforestation so its current value as a form of carbon sequestration can be seen as an added or side benefit that can further existing programs and policies.

7.2.1.2 Potential participants

Afforestation programs are unique in their types of participants. These include:

- "Investors", who could be governments or GHG emitters, are interested in securing the resulting carbon credits.
- "Managers", most likely forest products companies, may be interested in establishing and managing the plantation in return for access to the fibre at maturity.
- "Landowners" are the participants who will provide the land upon which the plantations are situated.

Potential investors and managers will vary according to the region of Canada in which the afforestation program is taking place.

The joint Sinks and Forest Sector Issues Table studies on afforestation concluded that there is approximately 1.1 to 1.4 million hectares of land in Canada that is likely available for afforestation. Over half of this is in the Prairie provinces. Almost all of the available land is privately held and is largely devoted to agricultural production. The number of landowners required to achieve this level of afforestation depends, of course, on the amount of land that each is prepared to commit. The current PFRA Shelterbelt program secures a commitment of about 1.27 ha per participant while the former Permanent Cover Program secured an average of 35 ha per participant. Using the smaller figure, almost 900,000 landowners would have to be recruited and using the larger about 32,000 participants would be required. Obviously, the greater the

commitment per landowner, the greater the incentive required to participate.

7.2.1.3 Characteristics of the types of sectors or actors that could participate effectively

These programs lend themselves to a wide range of participants. From a policy perspective, the most likely GHG emitters to be offered the opportunity to become involved in afforestation would be those who, for one reason or another, are not able to secure reductions in GHG emissions at source – at least in the short term. From a landowner perspective, the most likely participants are those who have a large amount of land that is currently marginal or unproductive and on which afforestation can offer a competitive alternate land use. For lands that are more highly productive additional incentives will be required as trees will have to compete with established returns from other crops. The conundrum for afforestation is that any plantations established to produce fibre will most likely be on more highly productive land, thereby increasing costs.

7.2.1.4 Main design features

As afforestation programs are not always VIs (they may, in fact, be purely business ventures), design features will likely vary. However, whether a project is a VI or a business venture it will need to meet certain criteria if the carbon credits it produces are to be recognized and potentially traded. Thus, the key design features will be the methods of measuring, monitoring and verification of performance. This will be particularly challenging when a project involves a large number of relatively small parcels of trees spread over a large geographical area.

- **How do participants join?**

Either investors (including government) or managers could stimulate an afforestation project by exploring partnership opportunities. Around the world (and recently in Canada), brokers are emerging who bring together investors and landowners to undertake afforestation. Landowners themselves can organize into associations for the express purpose of developing afforestation opportunities. As might be expected, given the number of potential participants in afforestation programs, the major challenge is going to be in making landowners aware of projects or programs and recruiting them as participants.

- **How will free riders be addressed?**

It is unlikely that free riders will be an issue in afforestation. What will command attention from critics is the extent to which GHG emitters invest in afforestation at the expense of making reductions at source because afforestation offers a less painful avenue of achieving their targets.

- **Transparency and reporting features**

As many afforestation projects are likely to be private sector business arrangements, transparency and reporting will be different than in other VIs. However, insofar as the carbon credits are concerned the manner in which these are earned - including measurement, monitoring and verification - should be open to scrutiny.

- **Incentives for participation**

One of the advantages of afforestation is that the carbon credits provided can help lever investments in other benefits of the project or program and vice versa. The biggest question, given the recognized benefits of afforestation, is why more of it is not already taking place, particularly in regions where the wood supply to the forest products industry is tight. The major

barrier appears to be that alternate sources of timber or bioenergy are much cheaper than fibre generated through afforestation. The question is whether the carbon sequestration potential of afforestation can tip the scales. From the Sinks / Forest Sector tables studies, it is apparent that carbon sequestration is unlikely to do so at current market prices.

A significant barrier to afforestation is that the majority of the costs are incurred up front while the carbon sequestration benefits are not fully apparent for more than a decade. Whether governments and GHG emitters are prepared to invest in afforestation depends on the costs of alternatives and the future value of carbon. Some believe that the value of a tonne of sequestered CO_2-equivalent will increase substantially in the future as deadlines loom and low-cost options for reducing GHG emissions are exhausted. The result is that significant incentives for afforestation are required in the short term in the expectation of a long-term payoff and thus the risk of investing in afforestation is potentially large.

To complicate matters, the incentives for afforestation must be provided to landowners who are not usually GHG emitters and thus may require added motivation to contribute to a climate change agenda. For the most part, landowners will look at afforestation strictly in financial terms, comparing the costs of keeping the land idle or in crop production against the benefits of switching to afforestation. The Sinks / Forest Sector table studies suggest that pure cash incentives could average about $1,100 per hectare for plantation establishment with opportunity costs (which would either have to be subsidized or offset through the sale of fibre at maturity) ranging from $100 per hectare to thousands of dollars per hectare depending on the region and current land use. Assuming it takes fifteen years for all the available land to be afforested, this would result in a minimum non-discounted cost of about $2 billion to plant 1.1 to 1.4 million hectares with trees.

7.2.1.5 Necessary or Desirable Supporting Measures

- **Role of government**

If afforestation is going to be a legitimate component of Canada's GHG emissions reduction strategy, governments will need to ensure that the associated policy framework is supportive of afforestation. This will include:

- policy direction, to define how carbon credits are earned through afforestation;
- a credit registry (e.g., VCR Inc.), using a standardized format for calculating and reporting carbon sequestration performance;
- an emissions trading regime, to enable participants who have no need for carbon credits to derive value from them;
- standards and protocols, to both govern the design of "qualifying" afforestation projects and to provide guidance in ensuring that afforestation projects are environmentally and economically sound and sustainable;
- technical support, through either the Canadian Forest Service or Agriculture Canada, to provide assistance in the design and implementation of projects;
- financial incentives and mechanisms, commensurate either with the carbon sequestration potential of the project or to complement this by supporting other project benefits; and
- awareness mechanisms, to make potential participants aware of the associated opportunities and recruit participants.

- **Barriers to be removed**

Setting aside the issues surrounding the scope and legitimacy of afforestation in the eyes of the Kyoto Protocol, there are few barriers to afforestation that can not be removed through the

provision of financial incentives to landowners. The other major impediments to landowner participation are lack of technical knowledge and lack of awareness, both of which can be addressed through the mechanisms referred to in the discussion of the role of government.

- **Role of industry associations**

An impediment to securing landowner participation is that there are few associations or organizations that can be employed to engage them. The participation of industry associations may be important to get GHG emitters (investors) or forest products companies (managers) to explore the potential of afforestation.

7.2.1.6 Feasibility

A number of other countries, such as New Zealand, Ireland and Argentina, promote afforestation aggressively. In these cases, the countries are looking to afforestation as a means of establishing a domestic forest products industry, with carbon sequestration being a side benefit. Argentina is perhaps the most ambitious with large subsidies from its federal (and some provincial) government being offered to attempt to afforest 200,000 ha per year. Canada does not need to do this due to the expanse of our forests and the maturity of the forest sector. Afforestation for the purposes of carbon sequestration is being explored in a number of Central American countries, notably Costa Rica, to capitalize on joint implementation opportunities. Most of these projects are small in size but offer significant potential for sequestering carbon. No other country has undertaken afforestation to the extent proposed in the Sinks / Forest Sector Table studies, and there are few examples of individual projects anywhere in the world that have afforested more than 20,000 ha.

Stakeholder views on afforestation will vary according to their area of interest. NGOs active on climate change will want to ensure that all aspects of an afforestation project are included in its carbon accounting and that credit is only given for net benefits. Most will also not support afforestation if it diverts attention away from reductions at source. For those not active on climate change, the major concern will be the impact of afforestation on biodiversity and other values. The issues here will be the extent of plantations, the species selected and the level of management intervention.

7.2.1.7 Potential Impacts

- **Time frame to achieve results**

The potential impacts of afforestation are substantial but are long-term. As trees take a long time to mature, the carbon sequestration benefits of afforestation will not be realized until the second commitment period. Even if afforestation of the scale proposed in the Sinks / Forest Sector tables studies commenced immediately and was successful, it would contribute only about 2% to Canada's performance in the first commitment period. The long-term benefits of afforestation are dependent on a variety of factors but could offer ten times that level of contribution in later commitment periods. This delay between investment and reward is a significant impediment to afforestation.

- **Cost**

The net cost of afforestation depends on a number of factors. The principal one is that carbon sequestration is only one of the benefits of afforestation. If undertaken purely for carbon sequestration purposes, afforestation could cost upwards of $2 billion. This cost may be

ameliorated somewhat by investments in the non-carbon benefits of afforestation, rises in the value of sequestered CO_2-equivalent and the profitability of processing the fibre produced through these projects. The net costs of afforestation can thus not be looked at solely in terms of carbon sequestration.

- **Competitiveness impacts**

The major competitiveness issue associated with afforestation is whether projects in Canada can compete with those in other countries. At current market values for a tonne of sequestered CO_2-equivalent, Canadian afforestation projects would require significant financial support for their non-carbon benefits to be feasible. Canadian GHG emitters are free to invest in afforestation in other countries (where more carbon can generally be sequestered more quickly and more cheaply) and this will determine the level of financial support that emitters are prepared to provide to domestic projects.

- **Other environmental impacts**

The other environmental impacts of afforestation depend on the scale of the project, the type of species selected and the level of management intervention. On the agricultural landscape, afforestation may provide improved biodiversity benefits (when compared to what was on the land before). However the management of plantations of fast-growing species may involve enhanced use of pesticides and fertilizers which could negate much of this benefit. The net environmental impacts of afforestation will be one factor in determining the level of incentives for the non-carbon benefits of afforestation. It should be noted that TransAlta has recognized that afforestation projects should not have an undue environmental impact and that governments could contribute to the production of standards for the design of such projects.

7.2.2 Forest Management Activities

7.2.2.1 Description

Forest management experts worldwide recognize that forests are treated inadequately in the Kyoto Protocol. The Protocol allows countries to offset GHG emissions by sequestering carbon through three activities only: reforestation, afforestation and deforestation (RAD). RAD activities represent a very small portion of forest carbon flows. Ignored in the Protocol are standing forests and wood stored in forest products, which store 12 billion tonnes of carbon (44,000 MT CO_2). While these carbon reservoirs are a source of some 120 MT CO_2 emissions annually, most of the emissions are from natural disturbances such as wildfire. RAD can potentially reduce net emissions by 1.3 million tonnes (MT) CO_2 by 2010, less than 1% of estimated emission reductions required to meet Canada's Kyoto target (June 7 draft Forest Sector Options Paper). Many forest management activities increase the level of carbon in the forest resource, including commercial thinning, juvenile spacing, genetic improvement, pest and disease control and fire control. Collectively they can contribute a greater share than the limiting RAD definition, depending on the method of measuring carbon benefits.

A promising voluntary program might take the form of a 'government challenge' to enhance the national forest inventory, but a more appropriate approach would be a 'forest industry association challenge' to forest products companies to enhance the national forest and forest products inventory. The store of carbon would be enhanced by increased activity in commercial thinning, juvenile spacing, control of pest disease and fire, and genetic improvement. The program could be initiated with a package of policies that would remove barriers to accelerated activity, as well

as a series of incentives to promote sequestering activity. It is anticipated the future COP agreements will encompass more human-induced activity for carbon accounting, and that early action in this regard will enable a greater impact in the target period 2008-12. Preliminary estimates are that other forestry activity could achieve CO_2 offsets of up to 23 MT, or 12% of Canada's target, depending on how methods of calculation are decided internationally.

Canada, like the US and many other countries, is unlikely to meet its 2008-12 targets unless all manner of sinks, including those from the existing forests and wood products, are included in future COP agreements. The American Forest and Paper Association actively supports the inclusion of existing forests and forest products in carbon accounting for meeting Kyoto targets. Further, the US Senate is currently reviewing the *Chafee Bill* that would give regulatory credit for emissions reductions and for carbon sequestration, thus recognizing that existing forests count as carbon sinks. The International Forest Industry Roundtable also promotes the inclusion of carbon enhancement of existing forests in future agreements.

7.2.2.2 Objectives

The objective of a voluntary program would be to enhance the amount of carbon stored in Canada's forests and in forest products, consistent with Article 2.1 of the Kyoto Protocol on the "protection and enhancement of sinks and reservoirs of greenhouse gases". The program would do this by expanding forest management activities undertaken by forest products companies, including commercial thinning, juvenile spacing, genetic improvement, pest and disease control and potentially fire protection. These actions, described in the *Sinks* and *Forest Sector* reports, offer verifiable carbon benefits as they increase the level of the carbon reservoir in Canada's forests.

Commercial thinning is the harvesting of a portion of a stand before it reaches rotation age to improve timber quality from remaining stems and reduce timber losses by utilizing fibre and biomass that would otherwise die naturally as the stand matures. *Juvenile spacing* is the removal of excess stems from over-dense stands of young trees that results in enhanced growth of the remaining trees. Larger tree diameters allow harvesting operations and subsequent planting of new trees to occur earlier. *Genetic improvement* is developing, producing and planting faster growing stock. *Pest and disease control* is the reduction in forest losses from insect and disease, either through tree mortality or growth reduction, by the use of environmentally benign spray agents or other mechanical means.

7.2.2.3 Potential participants

Participation in forest management initiatives would initially be companies in the forest products industry sector. The Canadian Pulp and Paper Association and other forest products associations could play central roles coordinating and negotiating program development and in reporting and verifying GHG sequestered.

As sequestration projects became known, outside investors would have the option of participating in those projects that offered either a lower cost per tonne carbon, or a better overall package of benefits than they could otherwise get.

7.2.2.4 Characteristics of the types of sectors or actors that could participate effectively

While the forest products industry would be the principal participant and investor initially, several other parties could become involved. For example, western Canadian energy companies wanting to offset growing fossil fuel production might enter into forest enhancement projects. Companies investing in cogeneration might consider entering into forestry projects providing carbon sequestration to offset fossil fuel burning at the cogen facility. Further, if emissions trading is established, carbon will become an international market commodity with a broad range of stakeholders from all sectors.

7.2.2.5 Main design features

The program would use a sector-based approach, and draw from the strong support of forest sector associations to reach leaders and early adopters in order to achieve the widest possible coverage. The associations would set targets, co-ordinate the fine tuning of estimates of the benefits of forest management initiatives, and ensure consistent reporting through the VCR. Associations would work with government to eliminate the barriers to increased activity, and develop a package of incentives that make sense. The associations could also act as a clearinghouse for additional forestry project opportunities that may be available to outside investors.

- **Transparency and reporting features**

The measurement and analysis of the amount of carbon sequestered by forest management activities in Canada must be defensible internationally. While much is known, more in-depth scientific study is required to confirm the impact over time of forest management activity on all carbon pools, including biomass, soils, and wood products. Companies routinely keep sample plots to determine the impacts of forest management, however, much of the impact needs considerable time to measure.

It is anticipated that companies will report the number of hectares for each type of activity by project, and estimate the amount of additional carbon sequestered or saved due to the project according to the best known and accepted methodologies at the time. As more study is done domestically and internationally, and as measurements are taken, adjustments to estimates can be made.

7.2.2.6 Necessary or Desirable Supporting Measures

While entering into initiatives that enhance the forest carbon reservoir is the 'right thing to do' from a climate change point of view, they would be entered into a countries carbon accounting only if negotiated into future COP agreements as allowed under Article 3.4 of the Kyoto Protocol. Therefore, Canada should act now to more accurately assess the impacts of various forest management activities and also promote their inclusion into future COP agreements.

Domestically, the acceleration of forest management activity would be triggered by implementing policies that remove barriers and provide incentives. It is estimated that policy changes would bear little cost but result in considerable activity. Early action on such policies would maximize the impact in the first commitment period 2008-12.

- **Barriers to be removed**

Forest management and silviculture treatments are cost-effective, feasible and applicable in various measures. Many factors that limit more widespread practice of sequestration and reduction actions apply to most forestry activities including afforestation.

The primary barriers to enhanced sink activities are:

1) ***the exclusion of these forest management and silviculture treatments activities under the current Kyoto Protocol.*** Most forest sequestration activities are not explicitly included in the current Kyoto Protocol, but there are discussions ongoing internationally to have other forestry activities negotiated into future agreements.
2) ***inadequate growth and yield data for managed second growth stands.*** Though the Protocol commits Canada to provide carbon balance information about forests, both as sinks and stocks, we are not in a good position presently to respond. Canada needs better forest inventory information that is timely, accurate and spatially explicit. Without good data, it is difficult for us to assess whether to consider the managed forest in our carbon accounting.
3) ***shortage of definitive scientific estimates of carbon benefits of forestry actions.*** Carbon benefits vary by species, region, soil type etc. It may be difficult to compare forestry projects with other GHG options without a better assessment of their benefits that is accepted domestically and internationally.
4) ***the lack of recognition of growth and yield effects of forestry activities on Annual Allowable Cut (AAC) calculations.*** With forest management actions that raise the present and future standing volume of wood, more can be sustainably harvested today. If additional harvesting were allowed today on the basis of higher projected wood volumes, more forest management would occur.
5) ***uncertainty over land tenure issues.*** Companies may be reluctant to undertake costly forest management activity if the right to harvest the wood is subsequently withdrawn, without compensation.
6) ***unresolved carbon rights ownership.*** Carbon is a new commodity and needs new rules for carbon rights ownership. Though this is an international issue, some aspects can be handled domestically. Companies, organizations and individuals are unlikely to invest in forest management activities to increase growth rates and sequester carbon unless questions about ownership are clarified.
7) ***no credit for action.*** Companies and investors may be reluctant to invest capital or initiate any action in emissions reduction and sequestration practices unless they know they will get credit for it. Clarity about domestic policies is required.

7.2.2.7 Policy Options

To promote other forestry activities that sequester carbon, the following are proposed as policy options. Some are simply recognition programs, which would cost very little and yet result in considerable voluntary action. Others are incentive programs that have proved effective internationally.

1) **Develop adequate growth and yield data for managed second growth stands:**

The Kyoto Protocol commits Canada to provide carbon balance information about forests, both as sinks and stocks. Canada does not have good forest inventory information. Available growth and yield information tends to be conservative and probably underestimates forest growth (and therefore the storage of carbon), especially in managed stands. A plot-based national inventory system to provide national level data on forest status and trends over time is required, particularly in managed stands. This system is needed now.

Timing: 1999-2001
Cost: Unknown
Benefit: a system that would provide statistically sound measurement of forest volume required in the Kyoto Protocol.

2) **Undertake scientific analyses to refine estimates of the carbon benefits of specific forestry actions.** While data is available on the effectiveness of forest management on some stands, more should be known about the impact of these activities by species, location, climate, soil etc., and on the impact on both the biomass and soils carbon pools. Study of existing and new data should begin now, both to provide more assurance of the carbon benefits, and to enable Canadian negotiators to approach international discussions knowing what activities will better allow Canada to achieve its net emission target.

   Timing: now
   Cost: $300,000 est.;
   Benefits: this knowledge would allow comparison with other GHG options and enable the selection of the lowest cost solutions. It would give value to the carbon and promote the activities.

3) **Recognize the growth and yield effects of forestry activities in Annual Allowable Cut (AAC) calculations**. With forest management actions that raise the present and future growth rates and standing volume of wood, more can be sustainably harvested today and made into products that enter the long-term product storage pool. Projected increases in wood volumes have been recognized in AAC calculations in some jurisdictions, such as New Brunswick and partially in Quebec and BC, however, they often are a result of hard negotiation and conservative provincial government wood volume estimates. Credit for these activities has been more problematic on volume based tenures than area based ones.

   Timing: 1999
   Costs: none
   Benefits: Provincial governments would gain an estimated $200 million in stumpage payments for the increased AAC. Industry would gain cash flows from increased production, and communities would gain through increased employment, higher wages and economic growth.

4) **Ensure compensation for withdrawn land tenure**. If forest companies undertake the expense of forest management activities that increase sequestration and benefit the provincial government landowners, companies should receive compensation for management activity undertaken on lands where tenure is subsequently withdrawn.

   Timing; now
   Cost: Provincial governments would pay compensation, and lose if the forest were included in a protected area but gain through increased volumes of wood if the stand were subsequently harvested.
   Benefits: companies would have more incentive to undertake activities knowing they will be compensated if there are withdrawals.

5) **Incentives for increased forest management activity**: Forest management is expensive. For example, commercial thinning costs more per M^3 harvested than final harvest, but stumpage paid by companies to provinces is usually based on volume and is the same for thinning as for

regular harvesting in most jurisdictions. Stumpage should be lower for thinning to recognize the added costs of thinning and to promote this activity. Inherent in this proposal is the need for a system that clearly identifies the additional wood resulting from this activity in the AAC calculations and separate from traditional old-growth or unmanaged second growth. Juvenile spacing costs money with no immediate gain for the investor. There should be more incentives for this activity, especially since it results in increased employment in chronically high-unemployment rural communities.

6) **Resolve issues on carbon rights ownership** Carbon is a new commodity and needs new rules for carbon ownership. Though this is an international issue and under discussion in many areas, carbon ownership seems to reside with the investor for incremental projects, or is negotiated amongst project partners. A guideline from the federal government on ownership of incremental carbon would promote such projects. The situation of wood in public forests on crown lands is considerably more complex with both domestic and trade factors involved. Federal and Provincial governments and industry should contribute to decisions on this matter.

7) **Establish "credit for early action"**. Credit for early action is being contemplated for GHG reduction activities after 1990. It is imperative that such credit also be given for carbon sequestering activities since 1990. Such credit could become active in the event of their inclusion in future COP agreements.

   Timing: now
   Cost: none
   Benefits: would promote early action.

7.2.2.8 Incentives for Participation

Forestry companies already undertake considerable forest management activity for a number of reasons including forest protection and wood supply enhancement, both under agreement and voluntarily. Incentives for accelerated participation are discussed above.

7.2.2.9 Feasibility

The acceleration of forest management activity is entirely feasible as it does not deal with the development of an entirely new initiative, such as a major afforestation program. Forest management activity is ongoing but can be increased by minor but significant policy changes at low cost. Many countries, e.g. United States, Australia, New Zealand, Norway, are gearing up for the eventual inclusion of carbon sinks by establishing specific policies, incentives and legislation now.

7.2.2.10 Potential Impacts

- **Environmental impacts**

In Canada, an estimated 8 to 23 million tonnes (MT) of CO_2 could be sequestered through forest management and silvicultural activities with the appropriate policies and incentives and with relatively little investment by the government.

It is estimated that commercial thinning could reduce net emissions by an estimated 4.8 MT CO_2 in the 2008-12 period, while juvenile spacing could have the potential to account for 10 MT. Genetic improvement could result in 2 MT CO_2 being sequestered in 2008-12 with the benefit increasing considerably over time. Increased pest and disease control could eliminate 1/3 the annual growth loss of approximately 18 MT of CO_2. Fire containment saves 6 million ha of forest and prevents the emission of approximately 580 MTs of CO_2 annually in Canada, though the benefits of additional spending are under debate. (*Canadian Pulp and Paper Association (CPPA)*, 1998).

In addition to significantly reducing domestic carbon emissions, the initiatives above offer other economic and environmental benefits

- **Economic impacts**

Forest management activities result in greater employment opportunities, contributions to rural communities, improved knowledge of the forest, and increased economic growth and wood supply. Practices such as pest and fire control, for example, protect the forest resource for all users. Thinning and juvenile spacing contribute to economic sustainability and job creation, especially in disadvantaged or high-unemployment areas.

These programs further support economic sustainability by maintaining or improving the wood supply for wood products industries and therefore the viability of local sawmills and pulp mills. Any increase in wood supply enhances the forest industry's ability to translate the wood resource to the economic benefit of the country. The Canadian forest industry is Canada's largest industrial employer that directly or indirectly generates close to one million jobs across the country. In 1997, direct industry employment was 253,700 and payments to federal and provincial governments through taxes related to direct employment in industry totaled $4.9 billion.

- **Time frame to achieve results**

The time frames for the impact of forest management vary from immediately to several decades. For example, fire containment has an immediate one-time impact on the emission of carbon, simply - what is not burnt is not emitted. While this is a significant factor and a very positive impact on climate change, under current rules fire prevention up to 2008 would have no impact on carbon changes in 2008-12. Pest and disease control prevents the emission from decay over several years, both as a result of prevented tree mortality and from prevented defoliation effects of the disturbance. Juvenile spacing may be slightly net positive or negative in the first few years after the spacing, but the real advantage is earlier harvesting and storage of carbon in wood products, and earlier renewal of the stand, which enables leaving forests standing that might otherwise been harvested. Similarly, commercial thinning may have slightly negative effects after the action, but harvesting more volume from a given stand enables other stands to remain unharvested. Employing genetically improved stock has a minor effect in the early years but the effect is exponential, with far greater volumes 25-40 years in the future.

- **Cost**

Funding of forest management activity varies by province. In Ontario for example, funds are set up from stumpage fees or area charges that can be applied for and used for forest management and protection. Funds are limited however. Regardless of the source of funding, costs for forest management can be cost effective on a per tonne carbon basis. For example, the estimated cost per tonne of a pest control and an early-attack fire protection program ranges between 70-75¢ per MT CO_2. The cost of juvenile spacing has been estimated at $2.70 per MT CO_2. Not included in this calculation is the value of the incremental wood, not only to the provinces in stumpage, but to the industry in its ability to convert the wood to value-added products, creating economic growth

and trade

Costs to the government or programs would be minimal.

- **Other environmental impacts**

Environmental sustainability is an integral part of forest management in Canada. In accordance with provincial legislation all harvested areas are regenerated using species native to the site. Over 95% of areas harvested are satisfactorily regenerated within policy targets in Canada. It is estimated that the CO_2, uptake for Canadian forests regenerated after 1990 will average above 14 million tonnes annually in 2008-12, or about 10% of the Canada's target. (*Canadian Forest Services*, 1995-96).

Most forest practices will result in improved erosion control, water quality and wildlife habitat of the environment. For example, according to a recent study conducted by the University of Toronto, *juvenile spacing* results in added nutrients (where thinnings are cut and left to decay on-site,) and can increase the suitability of habitat for wildlife.

7.3 Description of Other Selected Notional VIs

The VIs reviewed below represent a cross-section of possible voluntary action by corporations and individuals. The Issue Table did not have an opportunity to test these VIs with other issue tables and the descriptions below are therefore generic. As part of the next steps in developing a National Implementation Strategy, these and other VIs should be analysed on the basis of specific applications using the framework set out in Table 7.1, above.

The generic VIs described below are:

- Collaborative Efforts Agreement
- Supplier Challenge
- Sectoral Code/ Programme
- Company Code/ Programme
- Technical Assistance Programme
- Voluntary technical standards
- Programmes directed to the householder

The EVA Table selected these VIs on the basis of:

- their potential impact: we do not analyse VIs for which there is little Canadian experience or prospect (e.g., industry-community agreements);
- its value-added: many government stewardship initiatives are well-developed and it is unlikely that we could add much that the government does not already know;
- the desire to avoid duplication with the work of other Issue Tables (e.g., Municipalities, Public Education and Outreach); and
- available time and resources (which constrained the number of options we could analyse).

7.3.1 Collaborative Efforts Agreements

7.3.1.1 Description

Collaborative efforts agreements (CEAs; also known as negotiated agreements or covenants) are agreements between firms and one or more levels of government in which the parties undertake to work together to improve the firm's environmental performance. Note that this definition does not include agreements that provide regulatory exemptions (see "regulatory flexibility agreements" in Section 7.1 above).

CEAs can have a range of possible obligations and incentives (see below). They also overlap with other policy instruments. They typically incorporate a wide mix of mechanisms to encourage industry participation, such as informational incentives, economic incentives, and public recognition. Many of these mechanisms comprise policy instruments that can operate independently of CEAs. Similarly, CEAs and regulatory policies are not necessarily mutually exclusive and can complement each other.

Foreign examples of CEAs focused on GHG reduction include:

- The U.S. Climate Challenge program involves 120 agreements with the U.S. D.O.E covering over 600 electric utilities and 5 utility associations. These agreements outline the utilities' commitments to reduce, avoid or sequester GHG emissions.
- Australia's Greenhouse Challenge includes 22 cooperative agreements and 186 letters of intent between three federal agencies and companies in the mining, manufacturing, energy, commercial and services sectors.
- The Dutch Minister of Economic Affairs has signed 29 multi-year agreements with various industry sectors under which these commit to a 20 percent reduction in energy intensity between 1989 and 2000 in return for specified advisory, material and financial support.
- Similarly, the New Zealand Ministries of Commerce and Energy have jointly signed 21 agreements with various industrial, commercial and public bodies.

CEAs play a role in between regulations and voluntary codes. They can be very useful when action is required that goes "beyond compliance" with the existing regulatory regime but where it would not be prudent to rely on purely voluntary action to get there.

7.3.1.2 Objectives

CEAs can have a wide range of potential objectives. Typically, CEAs focused on GHG emissions involve commitments to reduce emissions and/or enhance efficiency by specific amounts.

Since they represent a formal mechanism for partnership between government and industry, CEAs could also take on several roles under emission trading, both before the beginning of the first emission budget period and during the trading budget period itself. Voluntary emission reduction actions tied to CEAs could form the basis for the distribution of early credits, for example. In addition, CEAs could provide bookkeeping and validation needs for an early credit system and could serve as an instrument for channelling tax incentives for early reduction actions.

Finally, many CEAs also have intangible objectives. In Canada, both government and industry participants have looked to the pollution prevention MOUs as a way to engender a less adversarial,

more open relationship. In addition, all participants see information sharing as one of the main benefits of MOUs.

7.3.1.3 Potential Participants

Most CEAs involve individual firms, although some can be negotiated by sectoral associations.

Firms voluntarily enter CEAs for a variety of reasons, including, for example:

- to gain economic benefits (e.g., a profitable opportunity for investment in pollution preventing or energy-efficient products),
- to gain public recognition for their environmental stewardship, or
- to test regulatory alternatives, reduce the need for future regulation, or seek regulatory relief incentives.

In addition to the policy context, the most important factor in determining whether a CEA will be effective is industry structure and capacity. The number of firms active in an industry sector, the degree of competition present, and the degree of concentration are important variables in determining a sector's potential response to a CEA. As a rule of thumb, the larger the number of firms, the greater the competition and the lower the concentration, the more difficult it will be to negotiate and enforce an agreement because it will be more difficult for the firms involved to reach consensus, and because there will be a greater risk of free riders. In addition, firms generally will be more capable of operating within a non-regulatory context if they:

- utilize effective environmental management systems;
- have effective leadership; and
- where the agreement will be sector wide, where they have an effective representational body.

In addition to satisfying these criteria, potential participants in CEAs to reduce GHG emissions, should also be within sectors:

- with significant reduction potential; but for which
- unstructured or unilateral VIs (sectoral and company codes and policies) are unlikely to be effective quickly enough.

7.3.1.4 Design Features

Although CEAs can be designed in a wide variety of ways, experience suggests that there is a core set of features of all effective environmental agreements. At a minimum, they should:

- be developed by means of a transparent process;
- stipulate clear, measurable targets;
- provide incentives for participation; and
- provide for the monitoring of results (by third parties if possible) and the publication of the agreement and of the monitoring results.

In some jurisdictions (e.g., The Netherlands), CEAs are legally binding and provide mechanisms to sanction non-compliance.

Although Canada has not used CEAs to address GHG emissions, it has considerable experience with the use of memoranda of understanding (MOUs) to promote environmental improvements such as pollution prevention. Saskatchewan, British Columbia, Ontario and the federal government have each signed various pollution prevention MOUs. Most of the Ontario MOUs, including all those co-signed by the federal government, follow the same pattern. While they do not formally

create new obligations, the fact of negotiating and signing an agreement imposes some good faith obligations to cooperate to ensure the success of the endeavour. Most provide for a government-industry steering committee that establishes a plan for information sharing within the affected sector.

In most cases, the members of the sector can agree to participate individually. If they choose to participate, they undertake studies of their premises, processes and products, draft an inventory of substances used, and propose projects to reduce the use or release of these substances. While some have been developed quickly, the establishment of most of the Canadian MOUs has required up to two years.

Most existing CEAs focused on GHG reductions:

- rely on "hard" (enforceable) forms of agreements;
- focus on "best practices" (as opposed to developing new technologies);
- cover domestic and international offset projects;
- require participants to prepare an emissions inventory and develop an action plan with numerical targets;
- require regular public reporting requirements; and
- require self-auditing with government or third party verification.

7.3.1.5 Supporting Measures

- **Role of governments**

CEAs depend in large part on: a) market demand for environmental quality and b) the threat of regulation. Thus, governments could consider:

- helping create public demand/awareness;
- creating a credible argument for voluntary action through scientific and socio-economic research;
- providing fiscal incentives;
- providing the infrastructure to negotiate the agreements, ensure consistency, and provide verification and public credibility;
- creating a credible threat of regulation.

Most CEAs include the promise of a range of government support for participants, including, for example:

- Process support to facilitate information sharing and objective setting
- Information and technical assistance, such as:
  - information dissemination, decision support tools, best practice guidelines, benchmarking, and evaluation tools;
  - training and education;
  - technical assistance;
  - audit services or assistance;
  - help in developing measurement standards.
- Market infrastructure development and market diffusion, including:
  - demonstrations of market-ready technology;
  - network organization, stakeholder meetings and workshops;
  - marketing tools;
  - product rating & labelling;
  - product or professional certification;

- incentives to promote early capital stock retirement;
- financial incentives (e.g., rebates, grants, concessional lending, tax credits, special depreciation provisions);
- market aggregation efforts (e.g., bulk purchasing, common user specifications);
- public recognition, awards, advertising, use of a logo.

- R&D support, including:
  - the government supplies R&D technical experts;
  - R&D network development (e.g., R&D stakeholder meetings and workshops);
  - demonstrations (i.e., proof-in-concept).

The New Zealand government, by contrast, has offered no positive inducement to participate in GHG-reduction agreements, but has threatened to regulate any sectors that do not negotiate an agreement committing to satisfactory targets.

As with all of the VIs reviewed in this report, governments must also provide a supportive policy context both to induce participation in CEAs and to encourage continuous improvement. It is important to ensure that the policy and legislative context supports the agreement, rather than work against it. Environmental decision makers respond to a wide range of influences. To the extent possible, government policy should ensure that each of these acts in a coherent manner that is consistent with the objectives articulated in the agreement.

- **Role of industry associations**

Where participation is by individual companies, industry associations can encourage participation by members. Where participation is sector-wide, the association must play a central role in negotiating the agreement and in ensuring broad participation. Sector associations can also play important roles in supporting information sharing on best practices, creating peer pressure to encourage laggards, and in coordinating reporting and verification.

7.3.2 Supplier Challenges

7.3.2.1 Description

Supplier challenges are requirements by governments or large corporate buyers of goods and services that suppliers and their products meet specified environmental attributes.

7.3.2.2 Objectives

The main objective of supplier challenges is to use the leverage of large customers to enhance the importance of certain environmental considerations in the market for a particular product or service. In the case of GHG-related supplier challenges, the objective would be to encourage suppliers to reduce their GHG emissions.

7.3.2.3 Potential Participants

Governments and businesses that are large enough users of the particular service or product to be able to influence the market are potential participants.

In Europe, the forestry and pulp and paper sectors are the most active in demanding less environmentally harmful transport options from freight suppliers. This appears to be due to several factors including:

- the relative importance of emissions from transport compared to other life-cycle stages for those sectors' product;
- the presence of "leaders" within those sectors;
- the existence of an advanced stage of pollution control or prevention within those sectors that motivates them to look beyond core operations for further opportunities for environmental improvement; and
- strategic considerations, such as the existence of a sector-wide competitive benefit in showcasing transportation initiatives.

7.3.2.4 Design Features

Supplier challenges typically start with an assessment by a company of the environmental impacts associated with the various stages of its product's lifecycle. When this analysis identifies significant environmental impacts associated with the activities of a supplier of goods or services, the company may challenge or require those suppliers to reduce the impacts of concern. Most of Canada's large automobile manufacturers have recently issued pollution prevention challenges to their main suppliers, for example. And in Europe, where transportation represents a significant proportion of the overall GHG impact associated with some companies' activities, a number of large firms have challenged their freight suppliers to provide less energy-intensive services.

These programs can either be developed collaboratively by a purchaser working with its various suppliers or it can be developed unilaterally by the purchaser and announced as purchasing criteria. Many of the existing corporate supplier challenge programs were developed on a collaborative basis. By contrast, the federal government's green procurement policies were developed more on a unilateral basis.

The European Federation of Transport and the Environment suggests that freight customers can:

- only use transport suppliers that account of their environmental impacts;
- establish a dialogue with transport companies to increase awareness;
- estimate the environmental impact of current supply and delivery chains, determine the significant impacts, and set priorities and targets for improvement;
- include in contracts specific requirements related to:
  - environmental management (e.g., must have an EMS, an environmental policy, an environmental training program, and/or clear targets);
  - policies and practices to reduce the transport of freight (e.g., with respect to vehicle routing, consolidation of deliveries, vehicle utilisation, return loading, improved trailer design, etc.);
  - policies and practices to reduce the impact of their vehicles (e.g., fuel consumption management policies, maintenance policies, and the use of cleaner engines, cleaner fuels, alternative fuels, improved lubricants and more aerodynamic vehicle designs); and
  - reliance on more environmentally-friendly modes.

The implementation of supplier challenge programs typically requires both analytical and outreach work. It is often necessary, for example, to adapt life cycle tools to estimate the contribution of suppliers to the overall environmental impact of a product. Companies also often must develop questionnaires, reporting protocols and other mechanisms for obtaining information in a comparable and easily understood manner from suppliers. In addition, it may be appropriate

for participants to work with competitors to minimize duplication of effort (e.g., in the development of analytical tools).

7.3.2.5 Supporting Measures

Although supplier challenges are implemented most commonly by individual companies, governments and industry associations can play useful supportive roles.

- **Governments**

Governments can play various important roles. For example, they can:

- help companies develop the analytical tools required to assess their life-cycle impacts.
- provide guidance with respect to environmental priorities, enabling companies to determine which aspects of their environmental profile they should focus on.
- stimulate market demand (e.g., by raising public awareness of particular environmental issue);
- reward leaders; and
- make the users of products and services responsible for the GHG emissions they generate.

The fact that many more European companies have issued challenges to freight suppliers than their North American counterparts, for example, is partly due to the promotion by European governments of an EMS standard (EMAS) that requires companies to look outside of their plant boundaries for impacts and potential improvements, and to report on these factors. In addition, a much more intensive public policy exploration of emission targets and more extensive use of economic instruments have created a context in which companies are being pressured to reduce their transport-related impacts, and are facing potential rising costs (through economic instruments) if they do not.

- **Industry associations**

The leverage provided by supplier challenges can be enhanced when they are conducted collaboratively by more than one company. A number of Canadian industries operate buying groups. In theory, industry associations could coordinate supplier challenges. At a minimum, they can promote participation.

7.3.2.6 Cost

The European experience with transport-related supplier challenges indicates that, although there can be a significant up-front research and design cost, such programs typically do not result in increased operating costs. Indeed, to the extent that they have forced transport suppliers to adopt more efficient practices, they have actually reduced transport costs for some participants.

7.3.2.7 Impacts

The experience in North America and Europe with pollution prevention supplier challenges indicates that they can be very effective. Overall impacts depend, of course, on the market leverage of the participants, the particular objectives they articulate, the existence of alternative technologies and so on.

7.3.2.8 Feasibility

The EVA Table was not able to ascertain the feasibility of this measure in Canada.

7.3.3 Sectoral Codes

7.3.3.1 Description

Sectoral codes and programs occur when companies, organizations or entities within a sector join together, usually through an industry association, to develop a common standard of performance for members.

7.3.3.2 Objectives

Codes encourage companies to conduct themselves in ways that benefit both themselves and the community. They can also serve as a sign to consumers that the organization's product, service or activity meets certain standards. The ultimate goal for sectoral codes is cultural change both for industry and consumers.

Sectoral codes of practice are usually process-oriented and frequently do not contain specific performance targets. Nevertheless, putting such systems in place can facilitate the ability of participating companies to work toward establishing performance targets and to meet existing regulatory requirements.

7.3.3.3 Potential Participants

Although any industry sector could potentially develop a sectoral code and program, several factors militate in favour of some sectors and not others (see Section 6.2.2 above on the circumstances supporting concerted voluntary action). Examples of existing sectoral voluntary programs include the Canadian Chemical Producers' Association's (CCPA) Responsible Care® Program, the Canadian Electricity Association's (CEA) Environmental Commitment and Responsibility Program (ECR Program), the Environment, Health and Safety Stewardship Program of the Canadian Association of Petroleum Producers and the Ontario Forest Industries Association's Code of Forest Practice. Participation in some programs is mandatory for association members. Many other sectoral codes of practice are non-binding.

7.3.3.4 Design Features

Codes are flexible and can be refined over time. They may consist of general statements of principles and obligations, as well as technical agreements pertaining to specific operational aspects such as reporting and dispute resolution.

Effective sectoral codes include the following features:

- explicit top-down commitment of leaders;
- explicit buy-in from the bottom-up (e.g., employees, consumers and operators) and corporate culture;
- clear objectives, expectations, obligations and ground rules;
- open, transparent dispute resolution systems;

Responsible Care®'s eight "P's" for encouraging compliance:

- public involvement;
- pulling together;
- peer pressure;
- performance measurement;
- public accountability;
- payback;
- partnership; and
- pride.

- meaningful inducements to participate;
- open and transparent monitoring and reporting process; and
- negative repercussions for failure to join or comply.

Certain characteristics are especially important in the case of sector codes. A well-established association of firms and organizations can facilitate the development of codes and standards. Associations can bring parties together, provide a forum for the exchange of ideas and serve as an infrastructure for the development and implementation of codes. As well, leadership from key firms or individuals within firms is important to persuade reluctant members to participate. Another key characteristic is an open and transparent performance monitoring and reporting process. Lastly, clearly defined, broadly supported inducements for compliance and sanctions for non-compliance are essential.

7.3.3.5 Incentives for Participation

There are several reasons for participating in sectoral codes. Voluntary codes can alleviate the threat of a new law, regulation or trade sanction; they can address public concerns thereby improving public image; they can increase the efficiency and effectiveness of operations.

Specific incentives for individual organizations include the exchange of ideas, access to technology or marketing tools, peer pressure and making participation a condition of membership in an association.

7.3.3.6 Supporting Measures

Voluntary programs are usually initiated in response to consumer or competitive pressures, market opportunities, the real or perceived threat of a new law, regulation or trade sanctions, or a combination of these. As governments can influence several of these factors, they can play an important indirect role in initiating the development of a sector code.

Governments can also help shape and encourage the adoption of codes. While codes are not legislatively required commitments, they operate within a legal environment that includes consumer, competition, health and safety, labour and environmental legislation and regulations, as well as tort and contract law. Sometimes, codes supplement legislation. Failure to adhere to a code may have legal implications, including regulatory or civil liability. Conversely, in some cases, adherents may use codes to help demonstrate (or refute) due diligence in prosecutions or to establish reasonable care or negligence in civil litigation.

Finally, governments can help encourage the continuous improvement of codes through credible threats of regulation or taxation and through ongoing efforts to create consumer and other market or public pressure.

7.3.3.7 Conclusion

Sectoral codes and programs are one approach industry can take to become more energy efficient. Sector codes have been shown to work in a cohesive sector that has a strong industry association such as the chemical and electricity sectors. The challenge in any code is determining the appropriate participants and the appropriate incentives. As there are many different possible participants involved with these three sectors, it is doubtful a single voluntary code would be

effective. Codes in these sectors would need to be multi-faceted and implemented in consort with other types of programs such as public education and outreach.

7.3.4 Company Specific Codes and Policies

7.3.4.1 Objectives

Voluntary codes and policies encourage companies to conduct themselves in ways that are beneficial to both themselves and the host community. Individual firms may articulate codes of practice or environmental policies either for efficiency improvement reasons or to distinguish themselves from their peers.[23]

Efficiency improvements can include maintaining flexibility and control over approaches to addressing environmental objectives as well as reducing costs through improved processes, products and systems.

> BP Amoco has announced a pilot emissions trading programme and has set a target to reduce its global greenhouse emissions by 10 per cent below 1990 baseline levels by 2010.
>
> *Press Release, 13th of April 1999*

The other objective – organizations distinguishing themselves from their peers – can include more specific goals such as:

- enhancing credibility in environmental management;
- being viewed as a good corporate citizen; and
- gaining competitive advantage through excellent environmental stewardship.

7.3.4.2 Potential Participants

Any organization is a potential participant for voluntary codes and policies. However, an important consideration for participation is the resources needed to implement a voluntary code. Most large organizations have the needed resources at their disposal, but SME's often do not.

> Kansai Electric (which supplies 17% of Japan's electricity) sets targets for CO_2 emission reductions for each of its divisions. If a manager fails to achieve a target, he or she must explain the reason for this failure at the annual climate change meeting chaired by the President.
>
> Sophie Linguri, *Kansai Electric's Strategy for CO_2 Reduction, 1990-2000*, IAE, 1998

7.3.4.3 Design Features

Codes are flexible and can be refined over time. They may consist of a general statement of principles and obligations, as well as technical agreements pertaining to specific operational aspects such as reporting and dispute resolution.[24] The key design features of effective company specific codes are:

- strong corporate culture that fosters innovation and change. This includes an explicit top-down commitment from leaders, as well as buy-in from the bottom-up;

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[23] Government of Canada, *Voluntary Codes: A Guide for Their Development and Use*, 1998.
[24] Id.

- makes good business sense;
- incorporating accountability mechanisms. Accountability mechanisms used by industry include public reporting, establishing transparent decision-making processes, Board of Directors sign-off, manager and staff performance criteria and third party audits.
- ongoing communications, monitoring and reporting. The public wishes "the books" to be wide open, yet companies have commercially confidential information to protect. Aggregated data, peer review, third party audits and auditor training may alleviate this issue.[25]

> Philips put in place its 25% energy reduction project in 1991. Philips facilities in The Netherlands improved their energy efficiency by 25% between 1989 and 1996, 4 years before their target. This represents a cost saving of US$20.25 million per year with a CO2 emission saving of 250 kton per year. Philips has since increased its internal goal to a 35% reduction by 2000.
>
> Sophie Linguri, *Philips' Strategy for Improving Energy Efficiency 1989-2000* International Academy of the Environment, 1998

An innovative corporate culture is one of the key features of company-specific VIs. Innovative technicians or engineers "on the floor" often catalyze new energy efficient or "green" technologies. Corporate executives can drive this behaviour through cultural and employee-oriented programs.

> Johnson & Johnson set up a corporate energy department after the first OPEC price shock in the early 1970s to reduce the cost of energy used in the company. In 1991, the company set corporate energy goals which raised the awareness and the importance of energy reduction throughout the company. The company has established a technical advisory council composed of its own facilities managers. The Council meets monthly to review new energy technologies. As a result of the energy efficiency measures it is implementing, the company estimates it will be saving US$10.75 million annually by 2000.
>
> Michael Thompson, *Johnson & Johnson's Participation in US VIs 1991-1998*, IAE, 1998

Companies are increasingly becoming proactive on climate change issues. Company specific VIs aimed at climate change include:

- internal evaluations of "carbon-liability" risk exposure;
- internal financial incentives (e.g., total cost accounting, "shadow" carbon taxes, internal trading) to support action on GHGs;
- internal management/human resource management incentives to support action on GHGs (consideration in employee evaluations and promotions and/or in CEO/senior management evaluation, corporation-wide training on GHG reduction opportunities, employee awards/financial rewards for good cost-effective GHG abatement ideas);
- using Life Cycle Analysis (LCA) and supply-chain management to support action on GHGs (e.g., requiring: GHG accounting from suppliers, VCR participation, suppliers evaluated partly on basis of GHG intensity);
- using LCA to reduce life-cycle carbon intensity of their product;
- using carbon offsets, or supporting development and research on criteria for carbon offsets – as part of a deliberate portfolio of GHG reduction measures;
- green power procurement;
- switching to low-carbon/renewable energy supply in their internal energy generation or operations;
- investing in renewable technologies in their pre-commercialization stage (helping them to market);

[25] The Conference Board of Canada. Prepared for Natural Resources Canada. *Framework Report: Incentive/Disincentive Systems for Voluntary Action,* 1998.

- diversifying or divesting portfolios to reduce the company's overall GHG intensity; and
- incorporating GHG risks into due diligence analyses for mergers and acquisitions.

7.3.4.4 Incentives for Participation

Companies have numerous reasons for initiating and joining voluntary codes and policies. One of the key reasons for involvement is that they often make good business sense. Thus, codes can:

- increase resource and energy efficiency;
- forestall future regulations and their associated costs;
- reduce costs;
- reduce accidents and clean-up efforts;
- reduce future liabilities;
- increase flexibility to deal with technical and capital upgrade investments;
- increase market share, competitiveness and trade advantages;
- alleviate pressure from peers, government and society;
- improve access to insurance and financing; and
- improve public image.

Other considerations for implementing codes and policies simply include improving the environment and "it's the right thing to do".

TransAlta Corporation is one example of how a company gained a competitive advantage through its environmental management systems. TransAlta is an energy company operating in Canada, New Zealand, Australia, Argentina and the USA. The company has a comprehensive sustainable development program that is integrated into its business operations. Its sustainable development program includes an initiative to return its net contribution of GHG to the atmosphere to 1990 levels in the year 2000. As part of its commitment, the company participates in the Voluntary Challenge and Registry (VCR) Inc., with measures to address internal efficiencies, customer efficiencies, renewable energy purchases, displacement of conventional plants with more energy efficient cogeneration and both domestic and international offsets. According to the company's 1997 VCR report, through a variety of voluntary actions, TransAlta was able to reduce its net GHG emissions by 600,000 tonnes below the 1990 levels. By the year 2000, TransAlta expects that it will reduce its net contribution of GHG emissions to the atmosphere by 2.3 million tonnes compared with 1990, a reduction of 8 per cent.

Due, in part, to its reputation for superior sustainable development performance and its comprehensive range of voluntary initiatives, TransAlta was able to win a bid to build facilities in New Zealand even though it did not have the lowest priced bid.[26]

7.3.4.5 Supporting Measures

- **Government**

Voluntary codes are more likely to be successful if the company rather than an outside party develops them. However, government can play a role in providing information, communicating performance and acknowledging leadership. Government can provide information on developing codes and policies (e.g., the recently published "Voluntary Codes: A Guide for Their Development and Use"). As well, NRCan's Office of Energy Efficiency (OEE) has a web site

[26] Id.

that provides tools and information on energy efficiency. These types of resources can be useful starting points for companies considering voluntary codes.

Another supporting measure is to recognize companies that are contributing to environmental protection, in particular climate change. One example is the OEE's conference on energy efficiency, which has helped showcase Canadian innovation and expertise in energy efficiency. The Voluntary Challenge and Registry Inc. could be another vehicle for recognizing and rewarding company specific initiatives.

Besides offering positive support measures, government can also send "negative" signals that encourage companies to implement voluntary codes and policies. For instance, the threat of government intervention is a major driver for voluntary action. Many private sector organizations cite this as a prime reason to move beyond compliance—before the government prescribes a course of action that may be more costly. Giving advance notice of pending regulations can also prompt companies to start making the necessary changes early, thereby smoothing the transition period.[27]

As mentioned previously, SMEs often do not have sufficient resources to implement VIs. Government can offer financial incentives to companies that are unable to incur large capital outlays. Such programs could include an extension of current programs such as Energy Innovators, Innovators Plus, Class 43.1 accelerated capital cost allowance and others.

Government can also provide explicit rewards for success. Many Canadian organizations are currently considering large capital investments in voluntary initiatives that support their environmental codes and policies. However, as noted in section 3, above, many Canadian firms are hesitant to implement a more costly solution, such as the early retirement of capital, when the future benefits are uncertain: a problem that could be remedied by an effective credit for early action regime. Explicit credit or the promise of some credit would be a strong driver for company specific codes and policies.

- **Industry Associations**

"Business learning from business" is one approach industry can take to encourage the adoption and implementation of company codes and policies. Companies can establish a formal or informal network to share experiences on environmental management systems, environmental issues and technical innovations.

The Emery Creek Environmental Association and the Lambton Industrial Society are two examples of the "business helping business" model. Both these associations formed voluntarily to address local environmental concerns such as air and water quality. By working together, these associations are finding the most effective means of reducing pollution without impeding competitiveness.[28]

7.3.4.6 Feasibility

Experience in other jurisdictions suggests that voluntary codes can be a worthwhile approach to addressing environmental issues such as climate change. Companies with a strong corporate culture, clearly articulated objectives, expectations and obligations have the basis for a successful

[27] See Scandinavian examples in Id.

[28] The Conference Board of Canada, *Voluntary Environmental Initiatives in Canada: A 1996 Status Report*, 1996.

voluntary code. "Environmental management is growing astronomically in its importance as part of the overall business strategy because it's about efficiency over the long term."[29]

The largest barrier to voluntary codes is resources, both time and money. This is especially true for SMEs who are struggling to meet near-term commitments. Industry associations can help overcome this barrier by helping to design the initiative and providing tools (e.g., "how to" guides) to facilitate participation and performance.

7.3.4.7 Potential Impacts

- Time frame to achieve results: Medium term
- Cost to participants: Medium
- Cost to government: Low
- Cost to the public: Low
- Emission impacts: will depend on the number of companies participating in voluntary codes and the depth to which the voluntary codes address climate change issues.

7.3.5 Technical Assistance Programs

Many organizations are not fully aware of technical opportunities related to energy efficiency and GHG mitigation technologies. Although there has been some success in raising awareness and understanding (e.g., through CIPEC), recent NRCan analysis indicates that all of "the low hanging fruit" has not yet been picked. In-situ technical assistance, help in life-cycle costing, supplier databases, technical demonstrations and procurement assistance are examples of initiatives that could help stimulate more voluntary action to reduce GHG emissions.

Technical Assistance Programs aim to accelerate the use and upgrade of "best-practice" processes and technologies, including the adoption of newly developed technologies that are not yet in widespread use. These VIs have the broad overall goal of "market transformation" – that is, transforming markets to achieve higher levels of product, process or system efficiency.

Various types of technical assistance are possible:

1. ***Technical information***: e.g. energy guides, suppliers' databases, etc. Provided by associations and governments and available publicly.
2. ***Customized technical assistance***: e.g. energy auditors from governments or associations providing design advice to specific organizations.
3. ***Technology procurement***: organizations make a voluntary commitment to make energy-efficiency purchases, upgrades, or demonstrations, with or without external assistance (can be in concert with first two options).

Note that this section does not discuss fiscal policies to promote technology adoption, such as R&D tax credits and technology purchase grants.

7.3.5.1 Objectives

To accelerate and expand the market adoption of lower-carbon products, processes and systems.

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[29] Robert Kerr; IISD and The Conference Board of Canada. *Beyond Regulation: Exporters and Voluntary Environmental Measures*, Prepared for the IISD and CETAC-West, 1998.

7.3.5.2 Background Issues and Examples

Many engineers and technicians are unaware of new technologies, innovations or systems which can reduce energy consumption and/or GHG emissions. Greater awareness of the cost savings associated with GHG mitigation technology can and does motivate industry to invest. The goal of improving understanding and awareness has led several industry associations to develop formal programs to share information about "best practices." Chrysler, Ford and General Motors, for example, are working together to sponsor major, semi-annual Energy Management and Energy Education and Awareness conferences, workshops and seminars. Through these conferences, the transportation sector has found an innovative way to involve energy managers in discussions and exchange of ideas and experiences.

Business helping business to improve understanding of environmental issues and provide opportunities for technology transfer: the Lambton Industrial Society (LIS) comprises 15 companies operating in Lambton County (Ont.). This environmental co-operative has been monitoring air and water quality since 1952. It invests in ongoing environmental research to better understand the local environment and to prioritize improvements. The LIS maintains a database of this research to provide measurements in the areas of greatest interest and potential impact on the community. Member companies establish their own goals, such as "members will fully understand the impacts of stressor on the local ecosystem." Supporting these goals are several commitments such as organizing conferences, seminars and workshops for exchanging information and *technology transfer* among members.

In some cases, companies are unable to assess the potential of specific energy efficiency and mitigation technologies. Without the necessary tools to analyze current or new technology, making an informed decision becomes more difficult. For instance, being able to conduct a life cycle analysis enables decision-makers to compare alternatives that are characterized by differing expenditures during the life of a product.

Another barrier, especially for SMEs, is the high cost of new technology. Restricted access to capital can be a barrier to undertaking a VI, even if the initiative shows financial returns in the medium to long-term.

7.3.5.3 Potential Participants

These VIs can apply to various participant types. They can apply to specific sectors; to different types of companies (e.g. SMEs); or to specific technologies (e.g. window technology). Some can focus on industries (e.g., the Swedish Program of Technology Procurement, which focuses on SMEs, and the US Motor Challenge, Green Lights, and Energy Star Transformers programs, each of which focuses on different energy using devices), on communities (e.g., Clean Cities, Rebuild America, and Cool Communities), or on individuals (e.g. EnerGuide).

Because SMEs have little time or money to investigate lower carbon technologies, they are the group that could potentially benefit most from technical assistance programs.

7.3.5.4 Main Design Features

- **Technical information**

Technical information of all kinds (energy guides, suppliers' databases, etc.) is included in this initiative. This information is developed, assembled and provided by associations, governments,

or other engaged stakeholders, and typically made available publicly. Industry Canada and Natural Resources Canada, for example, have developed a Canadian Environmental Solutions (CES) database featuring climate change mitigation technologies. In addition, Industry Canada and Environment Canada promote greater awareness of climate change issues through the Canadian Business Environmental Performance Office (BEPO) Web site by providing integrated access to climate change information on a sector by sector basis.[30]

- **Customized technical advice**

In this type of program, trained energy auditors visit and assess existing facilities or proposed designs. They calculate energy consumption, fuel costs, emissions profiles, life cycle costs, etc. They propose energy-efficient upgrades, technologies, processes and/or design alternatives. The owner voluntary chooses to adopt the suggestions.

In some cases, government agencies provide these services for free, along with a partial subsidy of new capital purchases. In some cases, private sector companies ("ESCOs") offer these services, in exchange for a percentage of future cost savings.

Colorama Dyeing and Finishing, of Hawkesbury, Ontario wanted to improve its cost effectiveness relative to competitors in Quebec and the USA. The Ontario Ministry of Environment conducted an energy audit for Colorama. This prompted Colorama to invest in new equipment including boilers, dyeing and drying equipment. The result was a 20% reduction in natural gas consumption, 25% reduced operating costs and a 30% increase in production.

- **Technology procurement**

Procurement programs can operate in a variety of ways. Governments can seek to influence the market penetration of certain technologies by specifying them for government procurement. Similarly, large companies can require suppliers to conform to specified "best practices." In some cases, governments can help initiate, support and reward such programs. The Climate Change Economic Analysis Forum has concluded, for example, that technology demonstration and procurement programs can be quite influential in accelerating the broad market penetration of new energy-efficient technology for the following reasons:

- The performance and productivity of technologies typically increase substantially as organizations and individuals gain experience with them.
- Learning curves indicate that a 20 percent reduction in costs for each doubling of cumulative output, are quite similar across the three technologies of wind, gas turbines, and photovoltaic (PV) cells. The learning rates are also similar between countries as shown by the PV costs in the USA and Japan.
- The rate of learning can vary enormously among different sectors and technologies. However, a rate of 20 percent is a representative mean value advanced in the literature.
- Learning curve considerations provide a powerful rationale for government support to initial technology development.

7.3.5.5 Incentives for Participation

Many technology assistance programs rely on educating prospective participants about potential cost-savings to motivate participation. In other cases, governments provide initial cost sharing or in-kind resources to help "tip the balance" in deciding to proceed.

[30] See http://Strategis.ic.gc.ca/CES/ http://VirtualOffice.ic.gc.ca/BEPO/

Rewards and recognition can go a long way to help a company to "engage". Many SMEs proudly display their "certificates of achievement", if for no other reason than to promote business. As section 6.1, above, argues, an explicit "credit" program (either credit for early action or through a future emissions trading scheme) would provide even greater incentives, especially for larger companies.

Threat of regulation or compliance issues can be a motivator for investigating and adopting new technology. But for the most part, it is a lesser issue in technical assistance programs than for other types of VIs.

7.3.5.6 Necessary or Desirable Supporting Measures

- **Governments**

Governments can act as a broker/facilitator for parties interested in fostering change in market structure or behaviour. Market transformation strategies are pursued that bring together all of the principal players involved in producing, marketing, specifying, and purchasing climate-friendly technologies.

For example, in the Swedish EKO-Energy program, the government undertakes to:

- provide advice on energy and environmental policies according to EMAS and ISO 14000 standards;
- educate the individual firms on the ENEU 95 purchasing principles;
- appoint and pay for the independent consultant who conducts the energy audit in the firm;
- conduct goodwill activities (yearly awards ceremony).

The Energy Innovators Program of Natural Resources Canada's Office of Energy Efficiency may well be the most important Canadian clearinghouse of information regarding energy efficiency technology. It provides resource materials, support services, contacts and funding for pilot projects. Many provincial governments provide face-to-face technical advice, audits and demonstration support.

- **Industry associations**

These types of VIs require the creation of networks of users, suppliers, consultants, and industry and trade associations to forge strategic market alliances in support of market transformation objectives. A strong industry association can provide a lead in technical assistance programs. For example, the Hamilton District Autobody Repair Association (HARA) provides environmental information and training sessions for its members, supported by provincial government, insurance companies, technical experts and others.

- **Other**

A key to the actual uptake of new technology amongst SMEs is a "delivery system". Information is most readily used if it is customized, and provided in an individualized manner (preferably face-to-face). With regard to technical assistance and procurement, CIPEC and NRC's IRAP are good candidates for delivery at the national level. Many municipal and provincial governments are already engaged, and should coordinate with the federal government and associations.

In addition, as the pollution prevention experience demonstrates, reaching leaders who can promote the message to the larger group is an important determinant of success.

7.3.5.7 Summary of Potential Actions or Incentives Related to Technical Assistance

- Government or industry associations enhance awareness of opportunities for GHG mitigation technology by providing information on energy management and practices to key decision makers within organizations in the form of newsletters, workshops and tool kits.
- Governments or industry associations facilitate or sponsor on-site services to identify opportunities for short and long-term energy efficiency improvements and GHG mitigation technologies. Incentives can include minimal fees if no action taken or reimbursement if recommendations are acted upon.
- Provide training opportunities: advise financial officers and engineers in life cycle costing.
- Develop new cost accounting principles for asset management that will permit GHG investments.
- Provide technical assistance to company engineers in adapting technology.
- Review and if necessary improve access and use of a data bank on mitigation technology and make it available to SMEs in particular.
- Provide selling tools to suppliers and purchasers of emission-reduction technologies and solutions.
- Information exchange between industry and the financial community (e.g., R2000 and green mortgages).
- Government could establish tangible credits for "early action".
- Provide systems and training for third party auditors.

7.3.5.8 Feasibility

Experience across Canada and in other jurisdictions, suggests that technical assistance programs are an appropriate approach. They are generally supported by clearly articulated policy goals from government, and by related programs (such as demonstration and financial support). Political and stakeholder support is usually strong. The smart use of technology is viewed by most as appropriate and non-threatening. The largest barrier to such programs is cost. They require extensive outreach and often individualized assistance.

7.3.5.9 Potential Impacts

- Time frame to achieve results: Medium or long term.
- Cost to participants: Low.
- Cost to government: depends on program design.
- Cost to the public: Low.
- Distributional impacts: depends on program design
- Competitiveness impacts: Probably positive.
- Emission reduction potential: Medium, but directly proportional to the resources invested in the programs.
- Other environmental impacts: Depends on the nature of the technical interventions.

7.3.6 Technical Codes and Standards

Like technical assistance programs, technical codes and standards aim to accelerate the application or upgrade of specified "best-practice" technologies and processes. This objective is

to promote more energy- or carbon-efficient products, processes and systems in the market place. They are closely related to Labeling Programs.

7.3.6.1 Objectives

Standards could be developed, reviewed and/or enhanced for the energy efficiency of various consumer products. Standards can also be developed for management systems, including environmental management systems. It is conceivable that such standards could also address ways in which management systems should account for GHGs and energy efficiency.

7.3.6.2 Potential Participants

Both international (e.g., ISO, IEC) and national (e.g., CSA, CGSB, BNQ and ULC) product and process standards are ubiquitous. They may be developed by formal standards development organizations (SDOs) following recognized processes (accredited by the Standards Council of Canada or the ISO), by ad hoc industry consortia, or by NGOs.

Standards can be supported by various industry sectors, but really apply to specific technologies. Standards ultimately affect consumers of products and services, although the consumer may or may not be aware of the technology background related to the purchased product. Some of the "softer standards" come in the form of information guides which are targeted directly at citizens (e.g. EnerGuide).

7.3.6.3 Design Features

Standards development typically follows well-established process that includes reliance on multi-stakeholder input and "consensus" based decision making. They are developed by knowledgeable scientists, engineers, manufacturers, users, and, often, government officials, often facilitated by an SDO. These standards are then made publicly available for comment, testing and voluntary adoption by manufacturers or other stakeholders. Conformity assessment can be done using accredited labs, certification bodies and registrars.

Under the U.S. EPA's Energy Star Program, computer manufacturers were encouraged to design more energy efficient computers and printers. Manufacturers helped to develop the resulting standards and technical features. Those products which meet the standards are eligible to display the "Energy Star" eco-label, and receive favorable consideration in government purchasing.

Canada's Model National Energy Code for Buildings and Houses was developed over years, with the input of many Canadian and international experts. It aims to increase the energy efficiency of new buildings. The federal government helps other jurisdictions incorporate the code into their building regulations. It is now referenced by the Ontario Building Code as good practice. Federal departments are referencing it in their sustainable development strategies. A software package is available to help building owners assess opportunities, benefits and compliance.

7.3.6.4 Incentives for Participation

There are many technical standards in existence, domestically and internationally. NRCan tracks these codes, and is helping to determine gaps. A bigger issue is application of the codes and getting the word out to manufacturers and consumers to use them.

The nature of incentives required to support the development and adoption of GHG-related standards must reflect the understanding that companies develop and adopt standards for a wide range of reasons. In some cases, standards are adopted to facilitate trade among suppliers and corporate consumers (e.g., a standard will be developed to ensure that all screws supplied meet common specifications). In other cases, they will be developed to respond to consumer concerns about safety. In a small number of cases, companies will develop and adopt a standard as a means of pre-empting regulatory development.

7.3.6.5 Necessary or Desirable Supporting Measures

- **Governments**

Governments can help create incentives to create standards by enhancing market awareness of the environmental issue and of the function that is/could be played by standards in addressing the issue. In the absence of industry demand for such standards, government may have to subsidize their development. Governments can also create incentives to use standards by referring to them in procurement policies or in regulations.

- **Standards Development Organizations**

The ISO, IEC, Standards Council of Canada (SCC) and the four accredited Canadian SDOs (CSA, ULC, CGSB and BNQ) are the key institutions leading the development of formal standards relevant to Canada. In addition, many professional and technical associations develop ad-hoc standards with respect to specific technologies and processes. Industry associations can be very important participants in the decision to develop standards, in the standards development process, and in the promotion of the use of standards.

- **ENGOs**

ENGOs can also play an important role. In some cases, ENGOs have developed standards of their own (e.g., the international Forest Stewardship Council standard regarding forestry practices). Their participation in the development and promotion of standards Also, it would be desirable for ENGOs to participate. This would require overcoming their suspicion of standards and providing financial support to ensure effective participation.

7.3.6.6 Feasibility

Experience in Canada and other jurisdictions, suggests that such technical codes are an appropriate approach. Political and stakeholder support is usually strong. The smart use of technology is viewed by most as appropriate and non-threatening. The largest barrier to such programs is the time and consultation required to establish credible, performance-based standards. Codes and standards must be specific enough to achieve GHG reduction goals, yet general enough to allow flexibility in technology and market development.

7.3.6.7 Initial Assessment of Potential Impacts

- Time frame to achieve results: Medium or long term.
- Cost to participants: Low
- Cost to government: Low
- Cost to the public: Depends upon standard
- Distributional impacts: Minimal
- Competitiveness impacts: Probably positive.

- Emission reduction potential: Medium, but directly proportional to the stringency of the standard and the types of technology covered.
- Other environmental impacts: Depends on the nature of the technical interventions.

7.3.7 VIs Focused on Individuals

7.3.7.1 Description

Although most of the measures discussed in this report focus on industry, it will also be necessary to develop VIs focused on individuals. All Canadians undertake numerous roles and actions on a day-to-day basis that influence GHG emissions: we purchase and use or operate items such as cars, homes, appliances, food; home heating and cooling systems, lights and gardens.

7.3.7.2 Objectives

VIs directed at individuals could have two distinct objectives: a) to change individual behaviour and b) to empower individuals with knowledge so they can influence industry (as consumers or employees).

7.3.7.3 Design Features

To be most effective, VIs should target individuals within their various roles as:
- home buyers
- operators of homes (as owners or tenants)
- vehicle purchasers
- vehicle operators/travellers
- consumers of goods; and
- dispensers of goods

Effective individual-oriented VIs should:
- include clear and concise communications. It is important to keep messages simple. Examples are "drinking and driving don't mix" and "reduce, reuse and recycle";
- provide informed choices and tools, not rules;
- contain clear objectives and expectations;
- include meaningful inducements to participate/act;
- contain minimum time requirements or costs to participation;
- provide messages at the point of purchase; and
- engage peer pressure.

7.3.7.4 Potential Sectors

The residential and transportation sectors could benefit from individual-centered VIs. Both these sectors' GHG emissions are due, in large part, to individual decisions and actions. As the following analysis suggests, however, governments currently use a wide mix of programs to alter individual behaviour, and simple exhortation and education has rarely proven effective on its own. As a result, the design and delivery of programs focused on individuals may have to:
- provide significant economic incentives, recognizing that individuals do not always act in an economically rational manner with respect to personal actions; and

- require much more direct, personalized delivery in order to overcome the considerable lack of awareness and motivation in acting to improve such intangible issues as GHG emissions or energy efficiency.

- **Residential Sector**

This sector is comprised primarily of small builders and individual homebuyers/homeowners. Energy demand includes space heating and cooling, water heating, appliances and lighting. Space heating is the major use, accounting for 61 per cent of total residential energy consumption.

There are three main areas where significant energy efficient improvements can be made: during the construction of new homes; during the renovation of existing homes; and during the operation or maintenance of homes (e.g. turning down the thermostat).

Current VIs in the residential sector include:

- consumer codes and standards like EnerGuide for appliances and homes;
- home energy retrofit programs like Reno$ense;
- construction of energy efficient new homes like R-2000; and
- buy-back programs for old appliances.

One type of VI would focus on encouraging individuals to demand low emission products and services. A second type could be directed at individuals operating, maintaining and renovating their existing residences. Existing housing accounts for more than 95 per cent of the available housing stock. Given the size and significance of this market, it is important to improve energy efficiency and related GHG emissions associated with existing houses when repairs and renovations are undertaken. The operation and maintenance of homes is another area where significant improvements can be achieved in energy efficiency.

Another VI that could potentially address all three residential areas—the construction of new homes, the renovation on existing homes and the operation or maintenance of homes—is a reward or credit system. Individuals' actions, such as buying energy efficient homes and appliances, that reduce GHG emissions would receive credits that could be used for other energy efficient initiatives or even for non-environmental purposes.

To be effective, VIs focused on homebuyers and owners likely will have to provide incentives. The R-2000 program has suffered from lack of support and incentives, for example. Although housing stock grows by approximately 160,000 per year, only about 8,000 R-2000 homes have been built since the program's inception in the early 1980s.

One incentive to address this issue is green mortgages. Based on the observation that homebuyers can be most effectively influenced to renovate and repair their homes within the first two years of taking possession, green mortgages provide preferential interest rates to finance energy efficiency and/or indoor air quality retrofits. Canada Trust, for instance, has what it calls an EnvironMortgage that offers a 2% cash bonus on the outstanding principle, and is available on R-2000 homes across Canada.

- **Transportation Sector**

The transportation sector includes road, rail, aircraft and marine activities. Within this sector, automobiles are the greatest contributors to GHG emissions.

The Transportation Issue Table is considering numerous measures to reduce GHG emissions. Some of these include:

- infrastructure improvements such as sidewalks, lighting, and paths;
- public transit improvements like increased frequency, reliability and pricing;
- ridesharing/carpooling programs; and
- marketing to promote walking and bicycling as a healthy and environment-friendly activity.

Many of these measures are directed at individuals. As with the residential sector, however, a significant challenge will be to create the necessary incentives to encourage individuals to respond to and participate in these programs. Long experience with numerous types of transportation demand measures (primarily designed to reduce driving) indicates that, without the right incentives, individuals will continue to drive (often alone), to operate their vehicles inefficiently, and to buy vehicles that are less environment-friendly (e.g. older and larger models).

One of the main problems is that we do not incur many of the costs of our transportation behaviour while we are doing it. Not only are many of the environmental costs externalized (e.g., GHG emissions and local air pollution), but we do not pay the day-to-day costs of operating a vehicle as they are incurred: much of the cost of a car is "sunk" in the purchase price, the annual insurance and license payments and in the occasional repair bills. One possible way to alter this would be to create a system where costs are incurred more directly on a kilometer-by-kilometer basis. Numerous variants of such a system have been discussed in the United States and Europe. One model would require that insurance and license payments be made at the gas pump: the more you drive, the more insurance and license fees you would pay. A variant would involve an annual allocation system, with credits removed at the pump corresponding to the amount of fuel consumed. Individuals with credits left over at the end of the year would receive cash back; those who exceed the credit limit would pay a fine.

Another approach is a government-led or industry-led voluntary commute initiative. Nortel Networks, for instance, is working with OC Transpo to encourage its employees to stop driving to work[31]. The main incentive of this program is a free bus pass. Other factors that have helped include a transit hub that provides a heated indoor place to wait, scheduling improvements, preferential parking for carpools, a website to find carpool partners, improved cycling and walking paths, new shower and locker facilities and encouragement to work from home.

7.3.7.5 Conclusion re VIs focused on individuals

As experiences as varied as the Ontario blue box or drinking and driving programmes illustrate, social norms and behaviour can respond over time to well-designed social marketing campaigns. Making participation easy, reinforcing education with incentives, providing consumers with affordable alternatives and mobilising peer pressure are some of the techniques that have proved successful in changing public attitudes and behaviour. Such changes not only lead to measurable emissions reductions of their own but by mobilising the public lay the groundwork for the necessary government measures in a National Implementation Strategy. Over time, the success of programmes aimed at the consumer will be enhanced to the extent that their message is foreshadowed in school curricula and that children acquire the values needed to make them environmentally-responsible consumers.

[31] The Southern California Air Quality Management District requires employers with 100 or more employees at a work site to develop and implement work trip reduction plans.

8. Estimating GHG Emission Reductions Impacts From VIs

One of the difficult challenges in designing VIs to reduce GHG emissions is estimating both their cost and their impact. There is little empirical evidence on which to draw, either in Canada or internationally. In the case of energy efficiency, data gaps (e.g., what are the energy use characteristics of commercial buildings?), modelling difficulties (e.g., what assumptions should one make about the diffusion of new technology?) and questions related to attribution (e.g., did company "x" cut energy consumption because of higher electricity prices or because of a VI?) make it very difficult to calculate the impact of current VIs.

NRCan has estimated the impact of VIs in Canada's Energy Outlook (i.e., existing VIs) by reviewing 272 initiatives (not all voluntary) expected to achieve definable energy efficiency or emissions reductions and 235 VCR submissions with quantifiable action plans. While noting that it was difficult in almost all sectors to disentangle the impact of the voluntary from the non-voluntary, it concluded that existing VIs might account for about 47 megatonnes in GHG emissions reductions from a business-as-usual scenario by 2010: about 10 megatonnes would come from reductions in energy end uses (in the residential, commercial, industrial and transportation sectors), some 27 from upstream production (mostly from oil and gas) and a final 10 from non-energy sources.[32] New VIs would add to this impact.

NRCan also notes that, as a general rule, VIs tend to improve existing capital stock and processes, while non-voluntary measures encourage investment in new stock. Non-voluntary measures will therefore tend to dominate the impact of future initiatives unless VIs are enhanced.

Another approach to calculating the impact of VIs is to estimate the unrealised economically-available energy efficiency potential.[33] This can be used as a partial proxy for estimating the potential impact of VIs involving the reduction of GHG emissions (i.e., not including carbon sequestration opportunities) because:

- most VIs to reduce GHG emissions will rely on improvements in energy efficiency; and
- it is reasonable to assume that decision-makers will not voluntarily invest in energy efficiency beyond what is economic. Unless additional incentives are introduced to encourage voluntary action, the economically attractive potential for energy efficiency gains therefore provides an upper bound for estimating the impact of VIs.

As Figure 1 illustrates, the economically-available potential for energy efficiency (the "win-win reductions" curve) can be seen as a curve rising over time as technology improves. How much of this potential individual decision-makers will choose to exploit will depend on many factors, including awareness, investment hurdle rates and the importance of energy costs as a share of overall costs. Collectively, therefore, decision-makers are unlikely to realise the full economic potential that is available. As a result the "VIs with no incentives" curve remains below the "win-win reductions" curve.

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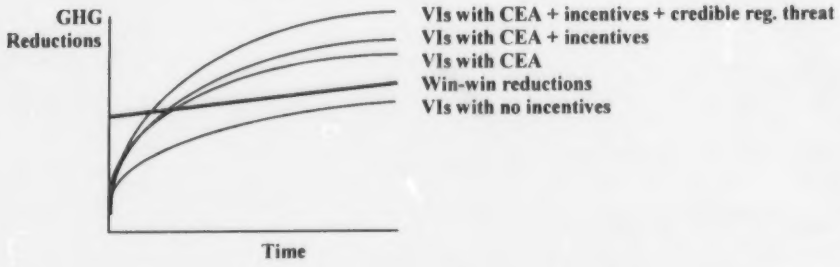
[32] Undated communication to the EVA Issue Table, May 1999.

[33] Several such studies have been conducted over the years both in Canada and internationally. These include Friends of the Earth's Soft Energy Path (1985), The Economically Attractive Potential for Energy Efficiency Gains in Canada (1991), Industrial Energy End-Use Analysis and Conservation Potential in Six Major Industries in Canada (1996) as well as the cost curve analysis referred to in the text.

As Figure 1 also illustrates, the addition of incentives, a credit for early action ("CEA") regime and a credible threat of regulatory intervention ("credible reg. threat") could each raise the overall impact of VIs up to the "win-win" potential and beyond if they provide sufficient motivation.

Figure 1: Estimating the Potential Impacts of GHG Reduction VIs



A recent analysis of the cost of reducing CO_2 emissions in Canada[34] provides one perspective on the existing untapped energy efficiency potential and, hence, the possible contribution of VIs to reduce GHG emissions. The results of this analysis are summarized in Tables 4 and 5. While this analysis is not comprehensive – because it focuses only on CO_2, does not include sequestration opportunities or changes to the demand for energy services, and carries the usual caveats that accompany any econometric modelling – it provides a useful approximation of the possible magnitude of existing "win-win" opportunities.

Table 4: Forecast Emissions[35]

Sector	Forecast Emissions in 2010 Assuming "Business as Usual" (kilotonnes)	% by which Forecast Business as Usual Emissions Exceed 1990 Levels	% by which Forecast Emissions Including all "Win-Win" Opportunities Exceed 1990 Levels	% Impact of "Win-Win" Measures on Forecast
Industrial	171,710	24	23	- 1
Transportation	181,282	30	27	-3
Commercial	32,190	24	- 4	- 28
Residential	38,001	- 12	- 22.4	- 10
Total	423,183	21	14	- 7

[34] The Energy Research Group, SREM, Simon Fraser University, November 1998: Cost Curve Estimates for Reducing CO_2 Emissions in Canada: An Analysis by Province and Sector, prepared for NRCan.
[35] Secondary demand only. Does not include potential impact of changes in nature of electricity supply.

Table 5: Opportunities for Cost-Effective CO_2 Emission Reductions

Sector	Possible Action	Direct CO_2 Reductions (kilotonnes)	Average Cost (1995 $/tonne CO_2) (negative # implies cost savings)
Residential	Hot water demand	2,408	-$817.64
Residential	Housekeeping	6,826	-$525.62
Commercial	Cogeneration	812	-$218.37
Transportation	Mode switching	4,542	-$191.58
Commercial	Technology use	4,418	-$175.71
Industrial	Pumps	1,475	-$137.95
Industrial	Compressors	161	-$110.85
Industrial	Technology use	7,880	-$48.77
Industrial	Conveyors	127	-$34.69
Industrial	Fans	161	-$2.40
Total		28,810[36]	

Source: Energy Research Group, November 1998, Table 11-1. Includes only investments with high or medium confidence.

Table 5 presents a list of the major opportunities to reduce CO_2 emissions available at no net cost (i.e., the investments pay for themselves and, in some cases, generate large savings). Numbers, such as the ones above always need to be interpreted with caution as they rely on several assumptions. With this caveat in mind, these numbers imply that:

- there are very significant untapped, economic, energy efficiency opportunities in every sector;
- the fact that these opportunities exist suggests that barriers currently prevent their realisation. As argued in section 3, above, these barriers likely include lack of awareness of the opportunities, lack of tools to take advantage of them, lack of credit for early action (in the industrial sector at least), availability of more attractive investment opportunities and, in some cases, low importance attached to energy costs. Successful VIs would have to overcome these barriers;
- VIs relying on "win-win" opportunities could make an important contribution to reducing the forecast growth in GHG emissions. However, these numbers also reinforce the argument made above that "win-win" measures alone will be insufficient to achieve stabilisation let alone absolute reductions in emissions. Incentives and/or the application of other instruments will be required to reduce emissions beyond these win-win opportunities.

9. Conclusion

Estimating the potential impacts of VIs implies more than technical analyses of cost curves and the identification of barriers and incentives to overcome them. The design of the initiative also matters. Well-designed VIs may exceed expectations where they convince decision-makers to focus on an issue they had not considered important before. The Ontario blue box programme, for example, achieved higher rates of recycling than had originally been anticipated, in part because participation was made easy and householders were convinced that recycling was the right thing to do. Chemical producers surpassed their initial goal of benzene emissions reductions when they were challenged to do so by the Minister of the Environment.

[36] This number is not directly comparable to NRCan's estimate of 47 megatonnes cited earlier because NRCan's estimate includes 10 megatonnes in non-energy uses.

To achieve such results for GHG reductions, Canadian governments, businesses, NGOs and individuals will have to ensure that the core recommendations of this paper are fulfilled. These include:

- establishment of the policy framework described in section 5;
- implementation of the necessary elements of an infrastructure as described in section 6;
- careful attention to the circumstances in which VIs are used as discussed in section 4.1; and
- incorporation of the design features summarised in section 4.2.

Appendix A: Lessons From Related Experiences

An effective climate change strategy relying on voluntary action will require a rare degree of social mobilisation. The way in which Canada and other countries have confronted similar challenges in the recent past sheds some light on the level of commitment a GHG abatement strategy will require, the barriers to overcome and the incentives required to motivate action. This section reviews: i) lessons learned from organizational change, ii) the North American experience with promoting pollution prevention, and iii) some of the major voluntary programmes on energy efficiency and climate change in other countries.

A1 Lessons Learned From Organizational Change

The effective institutionalization of VIs to reduce or offset GHG emissions will have to overcome most if not all the barriers listed in section 3 above. In doing so, they will benefit from a number of the proven features applicable to any sort of successful organizational change. These include:

- ***Clear, measurable objectives, baselines and targets*** - are required both in order to inform ongoing decision making and to provide a basis for monitoring, evaluation and internal and external reporting.
- ***Relating the initiative to the organization's core values*** - managers and employees will be more likely to sustain interest and support for an initiative if it relates to the organization's core values or mission. The highly successful pollution prevention initiative at Xerox, for example, was introduced and supported as a logical extension of the firm's traditional emphasis on quality. Similarly, most effective pollution prevention initiatives have been closely related to traditional concerns about cost saving and competitiveness.
- ***The ongoing, explicit commitment of senior managers*** - as the ISO 14001 guidance document emphasizes, senior management support helps reinforce awareness of the change, and can be particularly important when introducing an initiative that cuts across traditional management boundaries. The sustained interest of senior managers is particularly important when the change to be made is long term. The CEO's vision and priorities can have a determining effect on the actions taken.
- ***An ongoing commitment of resources*** - is necessary to ensure the translation of an idea into operational reality.
- ***A willingness and capacity to communicate across and outside traditional organizational boundaries*** - studies of successful corporate pollution prevention strategies indicate that the inception, development and implementation of such measures typically requires dealing with a diverse array of questions, including regulatory, engineering, financial and marketing issues. An integrating mechanism such as cross-functional teams will therefore often be essential. Many firms have also used outside expertise and stakeholder groups to explore or validate their approach to environmental issues.
- ***Consistent signals*** - ideas and support for change will be more forthcoming if they are encouraged, recognized, and rewarded. Yet, with the exception of changes to products and processes that reduce costs, many environmental initiatives, including those designed to reduce GHG emissions or sequester carbon will have a relatively long term focus, either related to market demand or to public and government image considerations. By contrast, existing decision-making procedures, reward systems and personnel evaluation criteria often focus on short term pay back considerations. For example, the implementation of the

stewardship requirements regarding downstream users of chemical products under the Responsible Care program has had to overcome barriers imposed by the incentives to sell regardless of intended use that are created by commission-for-sales compensation schemes relied on by most CCPA members.

- ***Institutional capacity*** - no business can afford to collect full information on all opportunities and threats. As a result, unless an organization has acquired the appropriate skills and tracks the relevant information, opportunities in low priority areas (as energy efficiency has typically been for many businesses) may not get seized even where obvious potential benefits exist.
- ***Useful information and analytical tools*** - one of the key impediments to the implementation of a GHG abatement strategy is often the lack of good information both about the environmental impacts of current and possible actions and about the costs and benefits to the organization of those impacts. In order to be able to monitor and evaluate the implementation of an initiative, it may therefore be necessary to introduce new analytical tools. Some firms are already experimenting with environmental accounting methodologies to trace their environmental impact.

These factors represent the *internal* conditions required for a company to respond to a VI programme, and are therefore distinct from any design requirements of the programme itself.

A2 Lessons From Pollution Prevention

With a decade of policy development with many programme elements, including a significant number of VIs, pollution prevention has several lessons to offer for the design of voluntary programmes on climate change.

Like climate change, pollution prevention involves all sectors of society, large and small, and all decision-makers. The capacity of these decision-makers varies greatly depending on factors such as their size and the salience of environmental protection issues to their concerns. Like energy efficiency, pollution prevention can offer "win-win" opportunities, at least at first. Also, like energy efficiency, these opportunities are often insufficient to meet public policy goals fully. While some North American companies have made pollution prevention a central element of their business strategy, most have not.

The differences between the issues of pollution prevention and climate change are at least as important as their similarities. While pollution prevention initiatives most often take place against a regulatory backdrop and are sometimes driven by regulation, there are no regulatory drivers in most areas of GHG emissions at this time. There is also a much greater social acceptance about the need to prevent pollution, particularly from toxic substances, than there is about limiting GHG emissions. These differences will make it more difficult to implement VIs in the area of climate change than pollution prevention.

An analysis of North American experience with respect to pollution prevention offers the following lessons relevant to the promotion of VIs to reduce GHG emissions. Although most of these lessons are broadly applicable, they are particularly relevant to the design of VIs in SMEs:

- ***Access to information is not sufficient*** to result in change: education efforts alone do not result in sustained changes in behaviour.

- ***One should not underestimate the profound change in behaviour that is required*** in shifting from control to prevention. Whereas pollution control can be delegated to process engineers, pollution prevention requires all divisions in a company to be involved.
- For pollution prevention to work in a smaller company, it ***must be easily incorporated into every day business***. Small businesses have small margins for risk, little time to learn new techniques and often cannot invest in big changes in equipment or process. Many businesses are not aware that substances used in the delivery of their service are an issue and what to do to address the problem. Frequently their decisions need to deal with short-term problems, and long-term issues are not considered a priority.
- ***Learning about how the audience is organized and what are their issues and constraints*** will help the development of effective strategies to convey the prevention message. Communication is most effective through established channels of information. Some businesses may belong to a respected trade association. Others have little formal association and may use suppliers or customers (*viz.*, Nortel training of its suppliers on phasing out CFCs) as a conduit for information.
- ***The credibility of a message depends directly on the credibility of the source***. The parties most likely to have pollution prevention expertise often are not trusted by, or available to, smaller businesses, while trusted channels of information (such as suppliers, industry associations and peers) may not offer the pollution prevention message.

A3 Lessons from Climate Change VIs in Other Countries

Most OECD countries also promote VIs to reduce GHG emissions. This section summarizes a review of agreements and initiatives in energy efficiency and sustainable energy for the industrial sectors in Europe, Australia, the United States and Japan. This review is not comprehensive as it excludes programmes designed only to raise awareness and is biased by the availability of information. Most of these initiatives predate the Kyoto Protocol, and are therefore perhaps more relevant for the range of approaches that they illustrate than their contribution to meeting international emission abatement targets.

Foreign GHG Reduction VIs Reviewed

- Australia Sustainable Energy Development Authority
- Australia Greenhouse Challenge Program
- Finland Agreements on Industrial Energy Conservation Measures
- Great Britain: Make A Corporate Commitment Campaign
- Swedish EKOEnergy
- US Climate Challenge
- US Energy Star
- Denmark: Agreements on Industrial energy Efficiency
- Netherlands: Long Term Agreements
- Germany: Declaration by German Industry and Trade
- Japan: Keidanren's Voluntary Environmental Action Plan
- Selected individual companies plans

General Observations

- These programmes address the full range of energy production/consumption issues, and require an active engagement by individual companies or industry associations.

- They are all cross-sectoral, but provide tailored services offered and targets to specific industry sectors or individual companies.
- They range widely in design, incentives, approaches to transparency and credibility, and recruitment.
- Five programmes explicitly complement a regulatory or economic policy lever (Denmark, Japan, Netherlands, Sweden), or the threat of one (Germany).
- Four countries provide a strong technology/audit assistance component (Australia SEDA, Denmark, Sweden, USA) in their programmes.
- Industry associations play a significant role in at least five of the programmes (Denmark, Finland, Germany, Japan, Netherlands). The industry associations in these programs include very specific sub- sectors (such as sugar refiners, flat glass, department stores, brick industry) as well as the broader industry associations.

Evaluating Effectiveness

- Only three programs require any form of third party verification of performance claims (Australia Greenhouse Challenge, Germany, and Japan). Five others (Australia SEDA, Denmark, Netherlands, USA) require self-reporting only. In Denmark and The Netherlands, however, broader, verified, environmental reporting is mandatory for many companies as it is for companies with EMAS registration, a requirement for participation in the Swedish programme. However, even programmes with mandatory reporting (such as the German programme) may not specify minimum reporting elements, such as baseline scenarios or common methodologies and definitions between sectors.
- Because reporting is neither consistently required not consistent between programmes when required, it is not possible to make observations as to the relative effectiveness of the programmes either in comparison to each other or in comparison to other possible policy tools.
- Where programmes do provide information on effectiveness, they do not seem to contribute to reductions beyond autonomous energy improvements (except for The Netherlands).

Programme Design

- The Danish programme provides a partial reimbursement of a CO_2 tax in return for participation; but commensurate with the scale of this incentive, the participation conditions are stringent.
- Many of the US programmes share a common approach. They involve a partnership between a government agency and a company that imposes mutual obligations on both parties. Typically, the company will agree to establish a baseline for its GHG emissions, develop an action plan with firm targets according to programme guidelines and report regularly on progress. In return, the government agency provides individualised technical assistance (workshops, analytical tools such as software, technical documents), in some cases grants, and agrees to publicise participation and recognise exemplary performance. The programmes focus on cost-effective measures to increase energy efficiency or reduce GHG emissions. Because they are purely voluntary, they involve no sanctions for lack of performance.
- The Australian SEDA follows a similar model to many US voluntary programmes but differs both because it is an independent agency established for the express purpose of promoting voluntary action and marketplace transformation and because of its very pro-active approach. However, some of its elements (e.g., green power) likely require a deregulated electricity market.

Appendix Tables

Appendix Table 1: Description of 14 Types of Possible VIs to Reduce GHGs

Type	Description	Supporting Measures	Time Frame for results	Cost To Government	Cost To Participants	Cost To Public	Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
1. **Government Stewardship Initiatives**	***Overview:*** This category of VI includes all programs developed by governments to reduce GHGs from their operations. At the municipal level, these can be quite significant. ***Objective:*** May include both demand and supply side objectives, including reduced energy consumption, fuel substitution, increased efficiency, carbon sequestration, etc. ***Potential participants:*** All government departments, agencies, and crown corporations. ***Main design features:*** Programs may be voluntary or mandatory and may or may not include reporting.	***Government:*** Programs will be established by government. They may be run within government or by an outside contractor. ***Industry associations:*** NA ***Other:*** NA	S - M	All current programs have been win-win. Future costs depend on the extent programs go beyond enhanced energy efficiency.	L – M Depends on program.	NA	High in relative terms, low in absolute terms. Government facilities (except at municipal level) are low emitters.	Some reduced emissions of other air pollutants are likely.	Many such programs already under way at all levels of government. Most such programs pay for themselves out of savings realised.	Already extensively done.

Type	Description	Supporting Measures	Time Frame for results	Cost To Government	Cost To Participants	Cost To Public	Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
2. Government Challenges	***Overview:*** These include both voluntary registry programs (e.g., the VCR) and the various programs that encourage environmental leadership without relying on binding agreements (e.g., CIPEC and Climate Wise – which are cross-sectoral – and the US Motor Challenge, Green Lights, and Energy Star programs, each of which focus on different energy using devices). ***Objectives:*** leadership by example ***Potential participants:*** predominately large companies ***Design features:*** Typically, these VIs use "soft" forms of commitments, such as pledges, letters of intent, unilateral declarations, or agreements to adopt guidelines.	***Government:*** generally these VIs are supported by a narrow range of government policy-support instruments such as information, promotional, and technical assistance; market diffusion instruments are generally not included. ***Industry associations:*** often play important recruitment and performance support roles. ***Other:*** ..	*M - L*	L	L Focus on win-win measures.	NA	Depends on related incentives. Can be significant over time.	Associated benefits	High	Already in use
3. Awareness Raising Programs	***Overview:*** These can include both public education and more targeted outreach programs. Both types are more fully described by the papers produced by the Public Education and Outreach Issue Table (PEOIT). ***Objectives:*** increased demand for and use of energy efficiency due to enhanced awareness and knowledge. ***Potential participants:*** full range of decision-makers, from individuals to institutions. ***Design features:*** The PEOIT Foundation Paper states that programs focused on specific behaviour changes are more effective than general public education programs.	***Government:*** See PEOIT Report ***Industry associations:*** See PEOIT Report ***Other:*** See PEOIT Report	M	M	L	L	L - M Often depends on associated programs	L - M	H	Already many examples in Canada

Type	Description	Supporting Measures	Time Frame for results	Cost To Government	Cost To Participants	Cost To Public	Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
4. Technical Assistance Programs	***Overview:*** These aim to accelerate the use of specified "best-practice" technologies. They have the broad overall goal of market transformation to achieve higher levels of product efficiency (or system-level efficiency) in the marketplace. A variant of such programs can include retrofit programs offered by energy service companies. ***Objectives:*** overcome market barriers and enhance existing market infrastructure to support energy-efficient and lower-carbon products. ***Potential participants:*** can focus on industries (e.g., the Swedish Programme of Technology Procurement, which focuses on SMEs) or on communities (e.g., Clean Cities, Rebuild America, and Cool Communities). ***Design features:*** • participants make a specified efficiency change over an agreed period; the commitment often involves purchasing or upgrading a preferred technology. • goals may be program-determined or jointly established by participants and government. • most community-oriented programs follow a structured negotiation process and use survey-based approaches as the means of verification, while those focused on industry are often more flexible and tend to rely on self-assessment. • no regulatory threat is implied. Instead, market instruments extending information, public recognition, and technical assistance are used to encourage participation.	***Government:*** Government participates in these programs as a broker/facilitator for parties interested in fostering change in market structure or behavior. Market transformation strategies are pursued that bring together all of the principal players involved in producing, marketing, specifying, and purchasing climate-friendly technologies. Governments can stimulate the use of ESCOs through: • education and awareness programs. • financial subsidies. • taxes on energy use. • rate structures for utilities (e.g., by rewarding "negawatts"). ***Industry associations:*** A key emphasis is on creating networks of users, suppliers, consultants, and industry and trade associations to forge strategic market alliances in support of market transformation objectives. ***Other:*** Utilities can run DSM programs.	S - M	L - M	L	NA	Depends on technology uptake		H	Already many examples in Canada.

Type	Description	Supporting Measures	Time Frame for results	Cost			Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
				To Government	To Participants	To Public				
5. Technology Innovation Programs	***Overview:*** These VIs focus on advancing the frontier of "best practice." Governments can use technical means and market-pull incentives to induce manufacturers or research institutions to make incremental innovations to existing designs. Alternatively, governments may aim to accelerate traditional R&D output by encouraging industry to voluntarily develop and commercialize advanced (i.e., breakthrough) technologies sooner than they would have done otherwise. The American Industries of the Future (IOF) and the Partnership for a New Generation of Vehicles (PNGV) programs match technology development priorities (both incremental and breakthrough) to the needs of U.S. industries through a government-industry dialogue and partnership process. The Golden Carrot Super-Efficient Refrigerator (SERP) program uses market-pull schemes to facilitate a relationship between large-volume purchasers and product manufacturers. ***Objectives:*** technological innovation. ***Potential participants:*** industry, government, academia. ***Design features:*** These VIs typically: • use structured negotiation processes and formal contracts; • use joint evaluation by participants and government or 3d party; encourage bilateral relationship building and cost-sharing among private sector technical experts, governments and academia to spur technology innovation.	***Government:*** Typically, these programs are not directly related to explicit or implicit regulatory threats. In some cases the government directly supports research institutions by providing economic stimuli (through R&D co-funding) to overcome private sector under-investment in R&D. The emphasis is on technological advances that require longer research time-horizons. Technological advances are more likely to be radical, breakthrough improvements rather than incremental ones. The technologies developed may require an extended period of testing and demonstration before market introduction. American examples of this approach include IOF and the PNGV. In other cases (e.g., the SERP), the government uses innovative market mechanisms, such as market-pull and aggregation schemes. The emphasis is on incremental or near-term technological improvements. ***Industry associations:*** NA ***Other:*** Research labs and academia.	M - L	Can be high	M	NA	Depends on program		Hi	Hi

Type	Description	Supporting Measures	Time Frame for results	Cost			Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
				To Government	To Participants	To Public				
6. Collaborative Efforts Agreements	***Overview:*** Firms are motivated to enter these agreements, in large part, by an expectation that the environmental leadership they display will be rewarded in the market. The greater the public demand, the greater the public recognition benefits. Examples are the New Zealand agreements, U.S. Climate Challenge, and Australia's Greenhouse Challenge. ***Objectives:*** program specific, involve commitments to reduce emissions and/or enhance efficiency by specific amounts. ***Potential participants:*** individual firms. ***Design features:*** Most examples: • rely on enforceable agreements; • cover domestic and international offset projects; • require participants to do a quantified impact assessment; • use government or 3d parties verifiers.	***Government:*** These VIs depend in large part on a) market demand for environmental quality and b) the threat of regulation. Thus, governments need to: • help create public demand/awareness; • create credible threat of regulation; • fiscal incentives; • provide appropriate infrastructure to negotiate agreements, ensure consistency, and provide verification and public credibility. ***Industry associations:*** encourage participation by members. ***Other:*** Some also involve NGOs.	M - L	Transaction costs can be significant	Transaction costs can be significant. May also be implementation costs.	Transaction costs can be significant.	M-Hi		M	Would be a new instrument in Canada.

Type	Description	Supporting Measures	Time Frame for Results	Cost			Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
				To Government	To Participants	To Public				
7. **Regulatory Flexibility Agreements**	**Overview:** ***These allow companies or sector organizations to opt out of existing regulations or taxes in return for specified environmental performance commitments. Regulatory relief is revoked and sanctions (informal or formal) may apply to participants who do not honour commitments.*** ***Examples of regulatory relief incentives are: pre-exemption from existing or future environmental regulations or taxes, simplifying environmental permitting, granting tax rebates, promising or guaranteeing a "stable" regulatory climate, and improving coordination of regulatory measures directed at energy efficiency. Exemption from future regulation is an important feature in the proposal by the Canadian Early Emission reduction Program Collaborative.*** *Objectives*: attainment of specific targets by participants *Potential participants*: individual companies or entire sectors *Design features*: These agreements: • are exclusively or predominately legally-binding with formal contracts (Project XL distinguishes between "enforceable commitments" and "purely voluntary" ones), • include clear penalty provisions, • use a structured negotiating process, where companies (or sector organizations) must satisfy certain planning and selection criteria before becoming signatories		S - M	Transaction costs	Transaction and implementation costs				May be politically difficult. May require legislation	Regulatory exemptions have not yet been applied in the area of climate change in Canada

Type	Description	Supporting Measures	Time Frame for Results	Cost: To Government	Cost: To Participants	Cost: To Public	Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
8. Labelling Programs	***Overview:*** these programs allow (or force) manufacturers to mark their products with labels certifying certain environmental attributes ***Objectives:*** stimulate market demand for green products ***Potential participants:*** manufacturers and industries ***Design features:*** Some are government run (e.g., EnerGuide), some are privatized (e.g., Environmental Choice), while others are run by NGOs (e.g., the Forest Stewardship Council). Some companies have their own eco-labels to differentiate themselves from competitors.	***Government:*** use ecolabels as a factor in procurement ***Industry associations:*** .. ***Other:*** increased public awareness is essential to the success of any ecolabel program	Medium term	L	L	L	L		H	Already applied

Type	Description	Supporting Measures	Time Frame for Results	Cost			Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
				To Government	To Participants	To Public				
9. Voluntary Product and Process Standards	***Overview:*** Both international (e.g., ISO, IEC) and national (e.g., CSA, ULC) product and process standards are ubiquitous. These standards may be developed by formal standards development organizations (SDOs) following recognized processes (accredited by the Standards Council of Canada or the ISO), by ad hoc industry consortia, or by NGOs. ***Objectives:*** standards have been set and could be reviewed and enhanced, where appropriate, for the energy efficiency of various consumer products. Standards have also been developed for management systems, including environmental management systems. It is conceivable that such standards could be addressed to address ways in which management systems should account for GHGs and energy efficiency. ***Potential participants:*** could apply to a wide range of industry. Would be developed by multi-stakeholder process. ***Design features:*** • adoption of standards is voluntary; • standards development typically follows well-established process that includes reliance on multi-stakeholder input and "consensus" based decision making; • conformity assessment can be done using accredited labs, certification bodies and registrars.	***Government:*** • Governments can help create incentives to create standards by enhancing market awareness of the environmental issue and of the function that is/could be played by standards in addressing the issue. • In the absence of industry demand for such standards, government may have to subsidize their development. • Governments can also create incentives to use standards by referring to them in regulations. ***Industry associations:*** can be very important participants in the decision to develop standards, in the standards development process, and in the promotion of the use of standards. ***Other:*** standards development organizations would have to indicate a willingness to address these issues. Also, NGOs would have to participate. This would require overcoming their suspicion of standards and financial support to ensure effective participation.	Medium term	L	There can be significant transaction costs.	L	L Because few voluntary standards being developed in energy efficiency.		H	Limited scope for unilateral Canadian standards.

Type	Description	Supporting Measures	Time Frame for Results	Cost			Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
				To Government	To Participants	To Public				
10. Supplier Challenges	***Overview:*** these are requirements by governments or large corporate buyers of goods and services that suppliers and their products meet specified environmental attributes. ***Objectives:*** market transformation. ***Potential participants:*** governments and large businesses. ***Design features:*** clear specification of desired attributes.	***Governments:*** can: • stimulate market demand (e.g., by raising public awareness of particular environmental issue); • help develop methodological tools (e.g., life cycle analysis, which can help identify significance of the supplier's contribution to the overall environmental impact of a product); • reward leaders; • provide guidance with respect to environmental priorities. ***Industry associations:*** can coordinate supplier challenges, or promote participation. ***Other:*** most commonly implemented by individual companies.	M	L	L	NA	L – M ?		H	Already being used for pollution prevention.

Type	Description	Supporting Measures	Time Frame for Results	Cost			Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
				To Government	To Participants	To Public				
1. Sectoral Codes and Programs	***Overview:*** voluntary codes are "codes of practice and other arrangements that influence, shape, control or set benchmarks for behaviour in the marketplace." They are: a) commitments, b) agreed to by one or more parties, c) designed to influence, shape or benchmark behaviour, and d) intended to be applied in a consistent manner or to reach a consistent outcome. ***Objectives:*** Codes encourage companies to operate in ways that benefit both themselves and the community. They can also serve as a sign to consumers that the organization's product, service or activity meets certain standards. ***Potential participants:*** various sectors. ***Design features:*** Codes are flexible and can be refined over time. They may consist of a statement of principles and obligations, as well as agreements about operational aspects such as reporting and dispute resolution. They can be initiated by individual firms, sector associations, governments, standards organizations (see above) or NGOs. They can apply to single companies, an entire sector or many sectors, nationally or internationally. Effective sectoral codes include: • explicit commitment of leaders; • rank and file buy-in; • clear objectives, expectations, obligations and ground rules; • open development & implementation; • regular flow of information; • transparent dispute resolution systems; • inducements to participate; and • negative repercussions for failure to join or comply.	***Government:*** Governments can help stimulate the development of codes since codes are usually initiated in response to consumer or competitive pressures, the perceived threat of regulation or trade sanctions or a combination of these. Governments can also help shape and encourage adoption of codes. While codes are not legislatively required commitments, they operate within a legal environment that includes consumer, competition, health and safety, labour and environmental legislation and regulations, as well as tort and contract law. Sometimes codes supplement legislation. Failure to adhere to a code may have legal implications, including regulatory or civil liability. Conversely, in some cases, adherants may use codes to help demonstrate (or refute) due diligence in prosecutions or to establish reasonable care or negligence in civil litigation. Finally, governments can encourage the continuous improvement of codes through credible threats of regulation or taxation and efforts to create consumer and other market or public pressure. ***Industry associations:*** help develop, oversee and improve sectoral codes.	M - L	L	Costs usually recovered from savings	L	M		H	H Several initiatives already underway

Type	Description	Supporting Measures	Time Frame for Results	Cost			Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
				To Government	To Participants	To Public				
12. Company-Specific Codes and Policies	***Overview:*** individual firms may articulate codes of practice or environmental policies either for efficiency improvement reasons or to distinguish themselves from their peers. Such codes can be very profitable (see examples in s. 4) ***Objectives:*** cost-savings or enhanced market access ***Potential participants:*** typically large firms ***Design features:*** widely variable, but all must be both effective and credible to satisfy market access objectives	***Government:*** See sector codes, above ***Industry associations:*** NA ***Other:***	S - M	NA	Costs usually recovered from savings	NA	Can be high		H Depends on interval factors in firm	H Several examples already
13. Company-NGO Agreements	***Overview:*** industry may enter into agreements with NGOs that commit the industry to specified environmental performance targets in return either for NGO assistance or for NGO agreement not to publicly criticize the participating companies ***Objectives:*** improved environmental performance and enhanced public image ***Potential participants:*** NGOs plus one or more individual companies or entire sectors ***Design features:*** highly variable	***Government:*** NA ***Industry associations:*** may be involved ***Other:*** NGOs	M - L	NA	L – M Costs usually recovered from savings	L-M	L		M	Little Canadian experience

Type	Description	Supporting Measures	Time Frame for Results	Cost			Emissions Impact	Other Env. Impacts	Feasibility	Conclusion re Applicability in Canada
				To Government	To Participants	To Public				
14. Company-Community Agreements	***Overview:*** local communities may enter into formal agreements with local industries for a variety of reasons, most of which lie outside of the community's direct scope of jurisdiction. ***Objectives:*** improve environmental performance or impacts within the community. ***Potential participants:*** community representatives, including both elected bodies and NGOs plus one or more individual companies. ***Design features:*** highly variable	***Government:*** local governments can play a very important role. The Rotterdam Port Authority was instrumental in creating the credible threat of civil liability that induced industrial polluters along the Rhine River to agree to abate their emissions. Local authorities in Japan use the threat of "collateral enforcement" (the threat of higher local taxes or more stringent licensing or zoning requirements) to elicit formal agreements regarding pollution prevention. ***Industry associations:*** NA ***Other:*** community organizations play a key role in these VIs.	M - L	Transaction costs	Transaction costs		L		H in theory but few drivers for this approach	No Canadian experience in climate change

Description of Afforestation Voluntary Initiative

Name	Description	Supporting Measures	Time Frame For results	Cost			Emission Impacts	Other Env. Impacts	Feasibility
				To Government	*To Participants*	*To Public*			
Afforestation Programs	***Overview:*** Programs in this category are intended to offset GHG emissions by sequestering carbon through the planting of trees. The eligibility of areas for planting has yet to be determined as a definition of afforestation is not yet agreed to under the Kyoto Protocol. It is likely to mean planting trees on lands that have not historically been forested or that were deforested more than x years ago. ***Objective***: Afforestation programs may be undertaken purely for carbon sequestration purposes but one of their attractions is that they can also provide a range of social, economic and environmental benefits that are independent of their carbon sequestration potential. Indeed, Canada and many other countries have long promoted afforestation and its current value in sequestering carbon can be viewed as a potentially attractive side benefit rather than as sole justification for the activity. ***Potential participants:*** Participation is required from several groups. While all governments and GHG emitters are free to invest in these types of projects, landowners are the most important and most difficult group to engage. Depending on the design of a program, anywhere from 20,000 to a million landowners may be required to meet Canada's afforestation potential. Investors without a stake in the carbon sequestration potential of afforestation but who have an interest in the fibre that could be produced from plantations (such as forest products companies in regions of tight wood supply) are also potential participants. ***Main design features:*** Design features will vary according to the type of program but the ones of primary concern will be those addressing the measuring, monitoring and verification of performance.	***Government:*** Governments will need to provide a range of supporting measures in order to "legitimize" afforestation as part of a GHG emissions reduction strategy. This will include: • policy direction; • a credit registry; • an emissions trading regime; • standards and protocols; • technical support; • financial incentives and mechanisms; and • awareness mechanisms. ***Industry associations:*** N/A ***Other:*** N/A	M-L	H Government has long supported afforestation in Canada, although incentives have been small. Governments can support either the sequestration benefits of afforestation, the non-carbon benefits or both. The scale of afforestation envisioned in Canada will require a substantial commitment of resources from governments, partly in direct incentives but also in providing the supporting measures described in column #3.	M-H Investors will likely only be willing to support projects up to the current or projected value of a sequestered tonne of CO_2-equivalent. Managers will invest in a project up to the projected value of the fibre produced (and possibly the value of the carbon, depending on project design). Landowners are unlikely to invest anything and will require payment at a level competitive with alternate land uses.	L Afforestation projects should impose minimal costs on the public.	H Afforestation will not reduce emissions but rather will offset them through the sequestration of carbon. The potential is significant but the full impact will not be felt until the second commitment period and beyond due to the slow growth rate of trees and the length of time required to afforest the more than one million hectares that is felt to be available. Afforestation requires a significant short term investment for a long term return and thus may best be viewed as a hedge against the failure of emissions reduction options.	L-M Other environmental impacts are a function of the extent of afforestation, the species used and the level of management intervention. Government has promoted afforestation in the past for its environmental benefits, thus it is unlikely that incentives would be provided for projects that did not contribute to that objective.	L Afforestation sounds easy but it has never before been done on the scale envisioned by its proponents in Canada. The investment in the supporting infrastructure and the effort required to recruit hundreds of thousands of landowners, paying them competitive prices for their land against alternate land uses, in return for a long-term contribution to Canada's GHG emission reduction commitments can not be discounted.

Appendix Table 2: Determining the Potential for EVA in Industry

Sector	GHG Emissions		Technical Potential				Corporate Structure and Culture								Public concern about sector	Conclusion re potential for EVA
	Percent of national GHG Emissions	Forecast growth in emissions 1990-2010	GHG emission intensity (H,M,L)	Recent improvements in GHG emission intensity	Unrealized economic gains from energy efficiency	Rate of technological innovation and capital stock turnover	Homogeneity	Level of concentration	Level of organisation	EMS sophistication	Openness to Trade	Price sensitivity	Penetration of existing Vis	Presence of leaders		
Electricity Generation		16%	M (sig regional variations)			L		H	H	H			M (7)	Y		H
Upstream oil & gas		27%												Y		
Minerals and metals					L-M		L		M-H	M	H	H	M (6)			
Transportation manufacturing		26%						H	H	H	H	H	M	?		H
Other manufacturing							L	L	Varies	Varies			M (11)			
Downstream oil and gas			H (sig Regional variations)					H	H	H						
Chemicals					H (?)	M	M	H	H	H	H	H	H	Y		H
Pulp & Paper																
Forestry																
Transportation																
Res. Buildings		-13%			H	L	L	L	L	L	L	H	L-M (8)	?		L
ICI Buildings		26%			H	L	L				L	H	L-M (8)			
Agriculture							L	L								
Municipalities			Varies		H	L	L	NA			NA	L	M	Y		H
Etc.																

Acronyms

CCPA: Canadian Chemical Producers' Association
CIPEC: Canadian Industrial Programme for Energy Conservation
CVMA: Canadian Vehicle Manufacturers' Association
CCA: capital cost allowances
CFCs: chlorofluorocarbons
CO_2: carbon dioxide
EMS: environmental management systems
ENGOs: environmental non-governmental organizations
EVA: Enhanced Voluntary Action
GHG: greenhouse gas
IRAP: Industrial Research Assistance Program
ISO: International Organization for Standardisation
NAPCC: National Action program on Climate Change
NGO: Non-governmental organizations
Nox: Nitrogen oxides
NRCan: Natural Resources Canada
OECD: Organization for Economic Cooperation and Development
OEE: Office of Energy Efficiency
RAD: reforestation, afforestation, deforestation
SDO: standards development organization
SME: small and medium enterprise
TDM: transportation demand management
VI: voluntary initiatives

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